

# COAL MINING

April, 1959

Volume 36, No. 4

rugged equipment for tough jobs...



Lima 2400 at Snyder Coal Co., Cowansville.

AA-9232

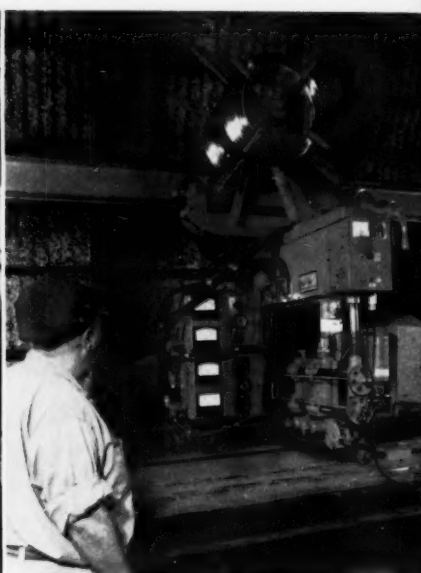
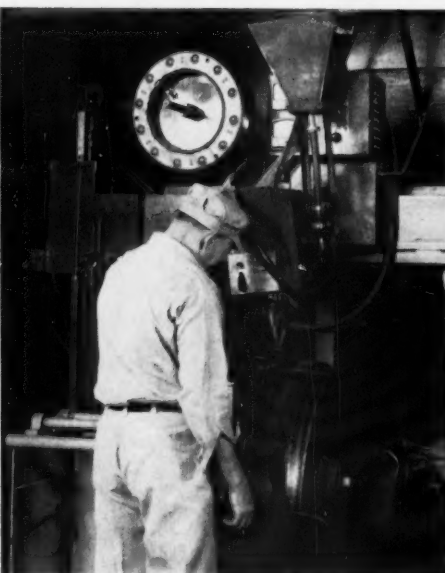
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# BECKWITH TRACTOR UNDERCARRIAGE REBUILDING WILL SAVE YOU MONEY!



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Add thousands of hours of life to your Caterpillar® track-type tractor running gear . . . track rails, rollers, idlers and sprockets . . . through Beckwith Machinery Company's rebuilding service. New rebuilding equipment of the latest submerged arc-welding type such as the Multimatic and L & B machines shown above in our shops can effect substantial savings for you on maintenance and new parts.

Under our "Fair Price" Roller Exchange Plan you pay only for the cost of bringing your trade-in roller up to factory new-parts standards, based on the class of wear of your old roller. You pay a fair price instead of a flat price. The "Idler Rebuild Offer" gives you free information to determine whether idlers are worn within limits so that they can be welded to effect savings. In Beckwith's "Rail Reviver Plan" we build up your track links to original specifications by submerged arc welding of both rails at once.

Check with any Beckwith field representative or see any of our Parts or Service Managers for complete details on this cost-saving service.

## IDLERS

## TRACKS

### HERE'S WHAT TYPICAL OWNERS REPORT:

"I'm having Beckwith rebuild my Cat D9 rollers for the second time because the first welding job put them in such good condition that they gave me comparable service to the production line originals."

Wilmer Kimmel, Kimmel Coal Company of Arona, Pa.

"We are entirely satisfied with the appearance and performance of the undercarriage rebuilt for our D9 tractor by Beckwith. We are especially pleased with the substantial savings."

William Edmunds, Edmunds Contracting Company of Frenchville, Pa.

"Frankly, we have been hesitant to rebuild rollers, rails or idlers but after watching the performance of Beckwith-rebuilt items in the field we feel the quality of workmanship makes it worthwhile to have our Cat D9 undercarriage rebuilt by your specialists."

Ray Turner, E. N. Turner & Sons of Harrisville, Pa.

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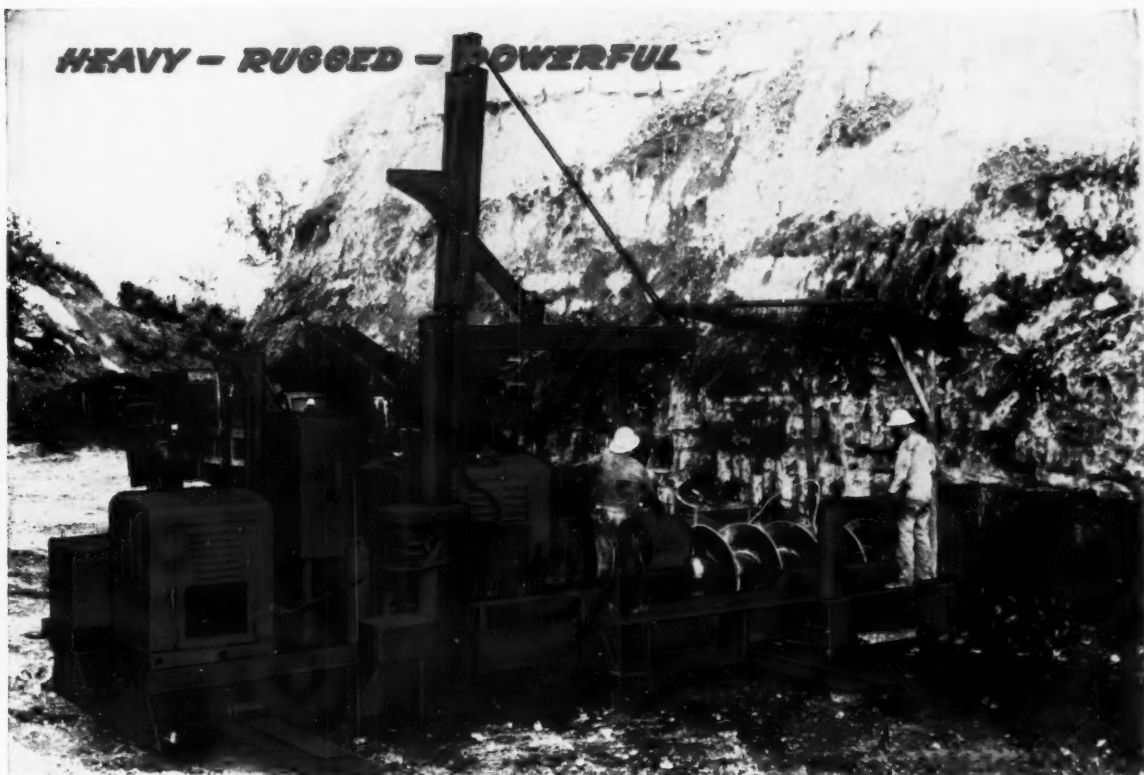
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**World's Fastest Heavy-Duty  
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Bores faster, deeper, larger dia. holes than any other auger drill. New gear reduction unit slows auger rotation for operation in hard rock formations. Drills 8" and 9" dia. holes readily in shale and sandstone formations, drills larger dia. holes up to 24" dia. in softer formations.

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**Lowest Drilling Costs per  
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Rotating Speed  
of Auger**

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**Provides Any Speed  
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Minute Horizontal  
Feed of Drill**

**VISIT OUR BOOTH NO. 2141 AT THE COAL SHOW**

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# power

# NEW D342

## CONTINUOUS HORSEPOWER WITH RADIATOR COOLING FAN\*

### 10:1 COMPRESSION RATIO

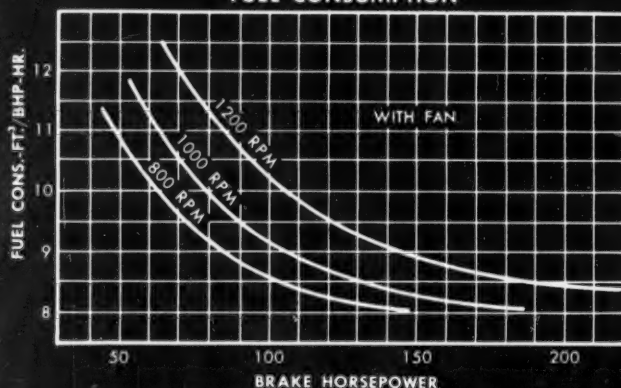
R.P.M.	800	900	1000	1100	1200	1300
H.P.	146	166	185	202	214	225

### 7:1 COMPRESSION RATIO

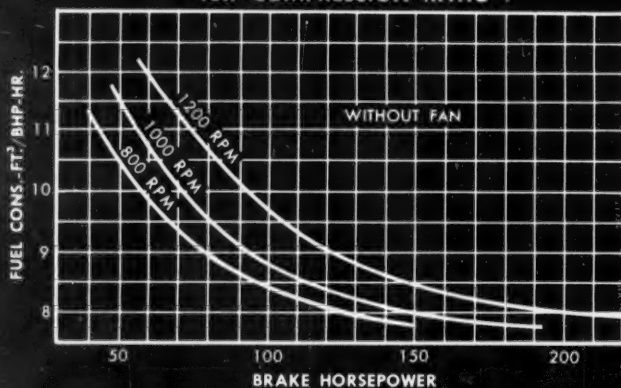
R.P.M.	800	900	1000	1100	1200	1300
H.P.	127	145	162	177	189	197

\*Additional Power Available With Heat Exchanger Cooling

## FUEL CONSUMPTION



### 10:1 COMPRESSION RATIO



With two compression ratios available, the Caterpillar D342 Spark Ignition Engine gives you the opportunity of getting the utmost in performance. The 10:1 ratio is for use with dry natural gas (as supplied through pipelines) which has a very high percentage of methane. For "wet" natural gas, butane or propane, the 7.5:1 compression ratio is used. Shown in the charts, at left, are the wide-open throttle continuous horsepower ratings available with Caterpillar Spark-Ignition Engines. The basic engine, which is designed for diesel operation, has a compression ratio of 15.7:1. Continuous Horsepower at 1200 RPM—7.5:1 compression ratio 200 HP; 10:1 Compression ratio 225 HP.

Fuel consumption curves on partial loadings clearly show the outstanding efficiency of this D342 engine to reduce your power expenses. Based upon present gaseous fuel costs, this Spark-Ignited Engine can reduce your fuel bill up to 50% over diesel operation. Fuel Consumption 10:1 compression ratio at 225 HP at 1200 RPM—7.9 cu. ft./BHP-hr. of 1000 BTU/cu. ft. gas. Write for full power and fuel consumption curves.

The heavy duty piston used in the D342 is designed with an efficient combustion chamber. A cast-in cast iron ring band gives longer life to the lightweight, cool-operating aluminum piston. It is simple to change the compression ratio. Only the piston needs to be exchanged to get the 10:1 or 7.5:1 compression ratio. You can get the utmost in efficient operation for your location by selecting the proper compression ratio, as influenced by the type of fuel available.

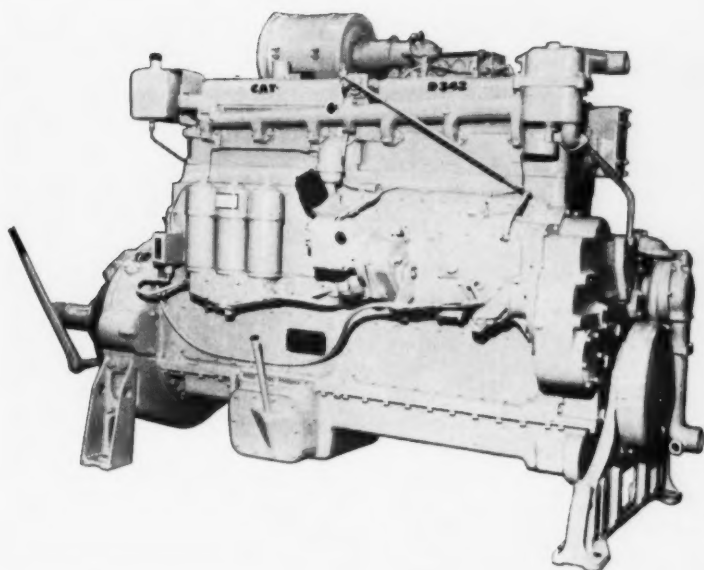
Maximum economy is assured by use of the low tension ignition system to get a strong spark at each plug. The low tension current from the special magneto generator is converted into high tension in the individual spark coils located adjacent to each spark plug. This ignition current is of a quality not possible to obtain with the common high tension system, which is subject to high line losses.



# **Spark Ignition Engine**

**from Beckwith**

## **Burns a wide range of low cost gaseous fuels**



To meet demands for a smaller spark-ignition engine, Caterpillar and Beckwith Machinery Company offer the new Cat D342 Spark Ignition Engine which develops efficient power at surprisingly low fuel costs.

Utilizing most of the major components of the diesel engine used in the Caterpillar D8 Diesel Tractor, this engine is low in first cost...and, like other Caterpillar products, has long life built-in.

If your fuel requirements or working conditions change, the D342 Spark-Ignition Engine can easily be converted to full Diesel operation by changing pistons and changing to a diesel fuel system in place of the ignition and carburetor equipment.

There are many applications where this economical power can be used effectively. These durable Spark-Ignited Engines offer great compactness and their new features provide high output with excellent performance in a wide range of installations. The basic requirement is a source of natural, petroleum or sewage gas. Costs can be reduced in many cases by using this engine to power drill rigs, coal tipples, pumping units, rock crushers, refrigeration plants, air compressors, saw mills, air-conditioning, irrigation systems, etc. It can also be used at low cost with electric generators for electrical power on many other applications.

Our Beckwith Caterpillar Dealer Engine Specialists will gladly help analyze your needs and recommend the Diesel or Spark-Ignited Engine that will do your job best. Call us for complete details...no obligation, of course.

### **Caterpillar Spark-Ignition Engines. Continuous Power.**

- D342-225 HP at 1200 RPM •D397-450 HP at 1200 RPM
- D375-300 HP at 1200 RPM (10:1 compression Ratio)

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# INTRODUCING...

## THE NEW INTERNATIONAL TD-20

**MORE POWER, MORE VERSATILITY, MORE GET UP AND GO....**



**C & F General Contracting Co. of Shamokin, Pa., is one of the earliest purchasers of I-H's new power-packed work-horse—the TD-20. Listen to these glowing reports.**

New TD-20 working at C & F General Contracting Company, Shamokin, Pa. Coal bank screenings are reclaimed from a culm bank more than 100 years old at the rate of 1,000-1,500 tons per seven-hour day.

### **Says President Walter Fogler:**

"The new TD-20 dozer replaced a TD-18 which worked approximately 4,000 hours during 17 months of continuous operation, moved over 1/2 million tons of material with less than 20 hours lost for minor repairs. The TD-20 can doze up to one-half more material per load than the old TD-18. It's faster, both in forward and reverse. Maximum dozer push—350 yards. The TD-20 has been the most effective crawler we have used on the job."

### **Says Operator Charles Bressi:**

"The TD-20 really has the workability and power I need to do this job, plus unmatched operator ease. The forward-reverse "shuttle bar" has greatly increased production with much less operator fatigue."

### **President Fogler goes on to say:**

"We have been using International crawlers for the past 10 years in various coal field jobs. (6 TD-18's and a TD-20.) We know the International crawler product, the good distributor service behind it, the fast workability, and the long overall life of the machine."

Call the State branch nearest you for a demonstration and information about the big, new, powerful TD-20.

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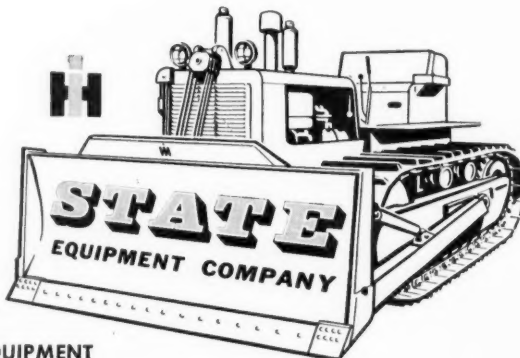
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# COAL MINING

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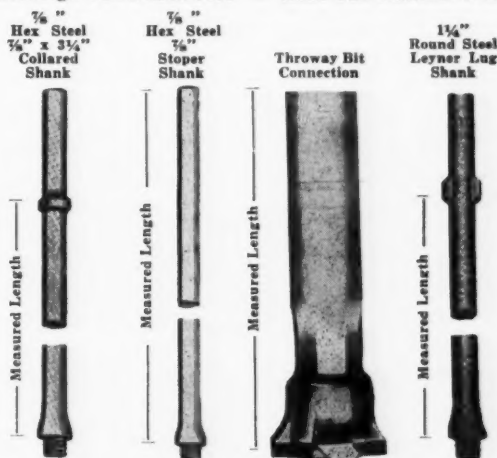
No. 4

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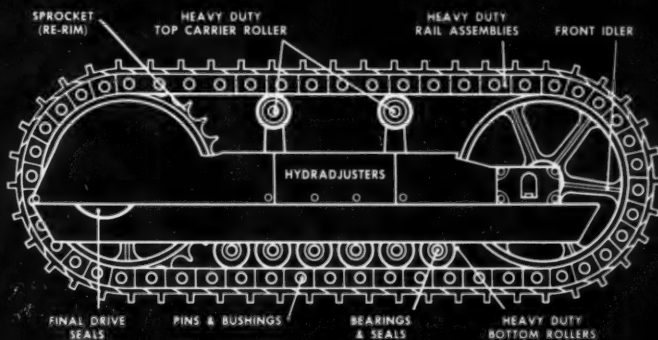
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Manitowoc and Euclid — the most rugged, heavy-duty stripping equipment you can buy — plus a complete list of smaller lines . . . compressors, buckets, air tools, etc. are yours through Anderson Equipment Company.

There's no stripping or coal loading job you can't handle with equipment from Anderson — so why not make Anderson your equipment headquarters and get the advantages of the best in stripping equipment plus complete service facilities for every machine sold.

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BROWNING MANUFACTURING CO.  
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WHITE MANUFACTURING CO.



Lima 2400 removing overburden at C & K Coal Co., Parker, Pa.

equipment from  
*Highway*  
 assures you lower costs...  
 increased production...greater profits!

Allis-Chalmers • Lima Shovels, Cranes, Draglines • Master  
 Thor • Gar Wood • Lima Roadpackers  
 Jaeger • Rogers Trailers • Heltzel  
 Buffalo-Springfield • Tractomotive

AA-9236



Lima 2400s, like this unit used by J. Russel Cravener, Echo, speed production at leading mines.

*Highway*



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● Paul A. Doorley, executive vice president of Connellsville Manufacturing and Mine Supply Company has been elected president of the Connellsville (Pa.) Chamber of Commerce for the 1959-60 fiscal year.



PAUL A. DOORLEY

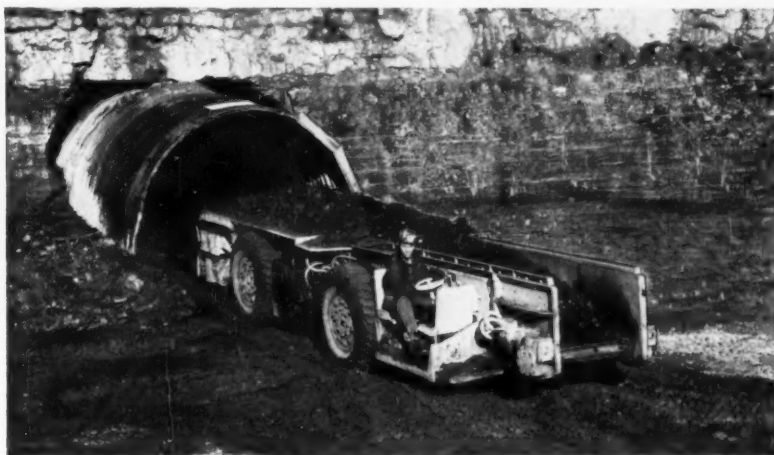
A native of Uniontown, Mr. Doorley is a graduate of Rider College of Trenton, N. J. He is a past president of the Uniontown Jaycees, in fact, the organization's first elected head. He also was the first president of the Dale Carnegie Club International in Uniontown.

● Henry Crown, chairman of Material Service Corporation, of which Freeman Coal Mining Corporation is a division, announced that development will begin promptly of a new 7,000 ton per day, deep shaft, highly mechanized coal mine in acreage some 3½ miles East of Benton in Franklin County, Illinois. Initial production from the mine, which will employ some 350 men, is expected in 1960.

To be known as Orient No. 5, this new mine will be served jointly by the CB&Q, C&EI, IC and MoP railroads. Cleaning processes in the preparation plant will employ heavy media separation and air flotation equipment. The mine will operate in the famous No. 6 Franklin County seam.

● Retirement of A. W. Rothacker, executive vice president and director of The Valley Camp Coal Co. was announced at the annual meeting on March 10 in Cleveland. William J. Lawson, president of Great Lakes Coal and Dock Co. of Milwaukee, a wholly owned subsidiary, was elected a director to fill the vacancy and Herbert S. Rich-

ley, vice president of Valley Camp, was elevated to executive vice president. Mr. Richley and Carl W. Steiss, treasurer, were elected to the executive committee. Robert W. Homan, a certified public accountant, formerly with Lybrand, Ross Bros. & Montgomery, was elected assistant treasurer and assistant secretary.



## AC SHUTTLE CAR GETS HIGH PRAISE IN TOUGH TEST

THEY are proving out the latest equipment and methods at Pittsburg & Midway's Colonial Mine, Madisonville, Kentucky, before switching from strip to underground operation.

Jeffrey equipment was tried out in rugged comparative tests for all-out production. Performance of Jeffrey's 67-AC-powered shuttle car was checked at every step. Precise time studies were made. Mining company officials summed up results: "That Jeffrey equipment should make a darned nice, profitable operation!"

In the initial operation, Pittsburg & Midway had a 76-B Colmol working on room-and-pillar mining in a 6½'-7' vein. The shuttle car loaded by the Colmol, traveled an average distance of

300' on grades up to 23% to a ramp, and discharged onto a belt which in turn dumped into trucks.

After test results were in, Jim Miner, general manager, W. "Deck" Humphrey, mining engineer, and Bill Moman, foreman, had special praise for such features of the shuttle car as: **Two speed discharge conveyor, Reversible discharge conveyor, Ease in handling, Smooth acceleration.**

Get all the facts from your Jeffrey district representative or write The Jeffrey Manufacturing Company, 969 North Fourth Street, Columbus 16, Ohio. Then see all the advantages firsthand, by putting the 67-AC to work at your operation.

### You're Invited!

Visit Jeffrey at the Coal Show...  
Booths 2743, 2755, 2843, 2855



MINING • CONVEYING • PROCESSING EQUIPMENT...TRANSMISSION  
MACHINERY...CONTRACT MANUFACTURING

# NEWS ABOUT THE COAL HAULING BUSINESS

**MARION**  
BODIES AND HOISTS

Marion Trailer Dumps Provide  
*Triple Pay-Off*  
For Saxton Coal Corporation



## Here's how!

- **PAYLOAD BONUS** ... This Indiana company put nine bigger (30 cu. yd.), lighter weight (with USS Cor-Ten steel) trailer dumps into operation, replacing nine 12-ton units ... and hauling the same daily tonnage (2,000) of coal twice as far (from mine to tipple the distance is now 6 miles) at no increase in cost per ton mile.
  - **PERFORMANCE BONUS** ... These units have been in operation for two years, each making 9-10 round trips daily with an unusually small amount of downtime. (Marions are built to take it "under a shovel and under all hauling conditions.") A total of 7 other units of the same type have also been purchased for Saxton's operation. Big, rugged and fast front end telescopic hoists (model F-815-T-204) raise the bodies.
  - **MAINTENANCE BONUS** ... Marion engineering and manufacturing plus high strength steel provide long, maintenance-free life. Cor-Ten steel is highly resistant to atmospheric corrosion and has greater impact and fatigue strength.
- Why not get complete information on Marion bodies and hoists. They're on-the-job designed with your profit in mind.

**MARION METAL PRODUCTS CO.**  
Marion, Ohio

● A new, front end telescopic hoist for 8, 9, and 10-foot bodies has been developed recently at Marion Metal Products Company. Over the past year, it has been completely job tested and approved and is now available.

The new hoist includes three models. The F-513T-65 is for 8-foot body lengths; the F-513T-72 is for 9-foot bodies; the F-513T-82 is for 10-foot bodies.



One of the most outstanding features of this competitively priced hoist is the ease in which the cylinder is attached to the body. This method of attachment not only speeds up installation but also allows fast, easy detachment for any servicing of the hoist in the field. The top connection is connected to the top of the cylinder before the body is installed. Then as the body is let down, the cylinder will guide itself into place in the cylinder housing. The body is then secured from the outside at the top by two bolts that fasten the body to the weld plate that is already attached to the hoist.

The oil reservoir with these model hoists is mounted on the side of the frame. This makes it possible to use a deep tank to provide a quieter, cooler, more efficient hydraulic system and eliminate the danger of drawing air into the system.

Other benefits and features include a weight savings of from 65 to 90 pounds; Marion's standard-duty pump with a safety relief valve; fast dumping speed. The hoists mount in their own sub-frames to provide a rugged, sturdy unit.



## Do You Know?

● Companies are getting more choosy in hiring engineers. Gone are the days when an engineering degree meant "open sesame" to a good job for graduating seniors, reports Cornell University.

"The cry now is not so much for more engineers as for better ones," said Donald H. Moyer, director of the office of student personnel for the University's College of Engineering.

The top half of this year's class will have "little placement problem," he said, but the below-average student may have to scratch around to find a suitable job.

He traced to the recession one reason for the back-off by industry. But other things have happened also: 1. Some companies have started training liberal arts graduates for some jobs previously held by engineers. 2. Many companies have hired technicians and technical assistants for similar positions.

An accelerated business recovery could add to the demand for engineering graduates this June, he said, but there will be 10% more graduates available this year than last. So this year's employment picture is expected to be about the same as last year's.

\* \* \*

● A prominent physicist has called for unified scientific research programs "encouraged and supported" by the Federal Government where feasible. Failure to recognize this has led to "serious loss in the American position in many sciences."

Dr. L. V. Berkner, president of Associated Universities, Inc., New York City, in a lecture sponsored by the National Science Foundation and the American Association for the Advancement of Science, said lack of such programs is slowing down solutions to many problems.

The basic deficiency in our present research organization stems from the fact that — except in fields related to military support, atomic energy, and health — there is no means whereby integrated research programs can be encouraged and supported by the Federal Government, he said.

In some fields, the character of the problems is such that they "cannot advance significantly without means for package support that permits integrated advances in the fields," Dr. Berkner said.

Not all science will yield to this type of support, but the form could be tailored to fit the needs, he suggested.

"This is clearly not recognized in the present policy of the National Science Foundation in supporting only a variety of unconnected research projects," he said.

## HERE AND THERE IN THE COAL INDUSTRY



C. O. CARMAN



K. S. HOBBS

● Six personnel changes are announced by Eastern Gas and Fuel Associates, effective March 1.

K. S. Hobbs has been appointed superintendent of the company's Stotesbury Nos. 10 and 11 mines, near Beckley, W. Va. Mr. Hobbs joined the company in 1947 as an assistant supply clerk.

C. O. Carman is named production engineer for Eastern's Low Volatile Division, which includes the company's Keystone, Eccles, and Stotesbury mines, all in southern West Virginia. Mr. Carman joined the company as a section foreman in 1941.

C. J. Kirby, superintendent at the Stotesbury Nos. 10 and 11 mines, has been granted a leave of absence. A veteran in the coal fields, Mr. Kirby joined Eastern as a section foreman in 1932.

Donald W. Hunter, production engineer at Eastern's Sonman mine in Central Pennsylvania, has been named resident engineer at the Wharton No. 1 mine at Wharton, W. Va. He joined the company as a rodman in 1951.

John P. Baugues, who has been the resident engineer at the Wharton No. 1 mine, is transferred to resident engineer at the company's

Federal No. 1 mine, near Fairmont, W. Va. He joined Eastern as a rodman in 1950.

Frank W. Riddle, who has been resident engineer at the Federal No. 1 Mine, has been named a member of the Chief Engineer's Staff in the Engineering Department of Eastern in Pittsburgh. He joined the company as a transitman in 1945.

● Dennis A. Mooney has been appointed superintendent of the Montcoal operations of Armco Steel Corporation's West Virginia coal mines.

The announcement was made by C. O. Kane, manager of the company's coal mining operations here.

Mooney succeeds A. E. Oakley, who is retiring after 25 years with Armco.

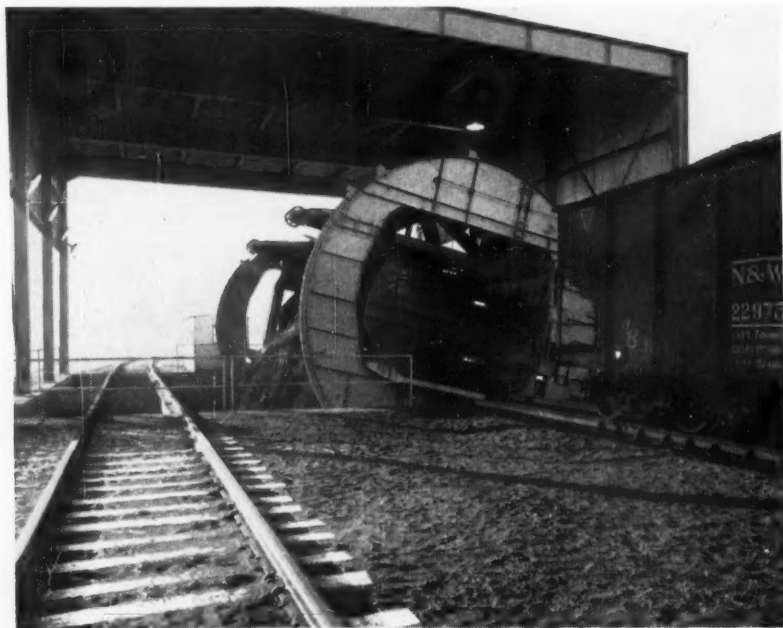
Mooney joined Armco at the company's Nellis, W. Va., mine in 1929. After a variety of assignments, he was made assistant foreman in 1940. In 1945, Mooney was named general foreman of the Nellis mine.

He became general foreman of the Montcoal mine in 1948, and held that position until his recent promotion.

# Moss No. 3 Preparation Plant Of The Pittston Company



Raw coal from the mine is dumped from railroad cars by Link-Belt rotary car dumper at center rear. From dumper hopper the coal is conveyed at 2,000 t.p.h. to crusher station and then to 2,500-ton storage bin. Plant feed belt conveyor (gallery in foreground) carries coal to top of preparation plant.



Twenty-Two 70-ton cars are dumped in 45 minutes of each hour by Link-Belt rotary railroad car dumper, which operates on 60-second dump cycle.

● One of the richest virgin seams of high quality metallurgical coal in the United States is now being mined at the Pittston Company Moss No. 3 mine. By the end of 1959 it will be producing at the rate of 5 million tons a year.

The rich Tiller seam in southwest Virginia averages 10 to 15 ft. in thickness. But because it is separated into two benches by a rock parting, for years mining engineers considered it neither physically nor economically feasible to mine. Profitable recovery of this coal has been made possible only by:

- 1) full-seam mining with continuous mining machines which load not only the coal but the rock, shale and other impurities; and
- 2) the largest and most highly automated coal preparation plant of its kind in the world — an automatic processing machine ten stories high which cleans 800 lbs. of coal *each second*, separating the coal from impurities and producing both metallurgical and steam coal products.

The Moss No. 3 coal preparation plant of Clinchfield Coal Company Division of The Pittston Company, with capacity of 1,500 tons an hour, was designed, built and erected on a "turnkey" contract by Link-Belt Company.

The plant is located at Clinchfield Va., only a short distance from the 450-t.p.h. Moss No. 2 plant, which was also built by Link-Belt on a turnkey contract.

The coarse coal is cleaned in Link-Belt's new tank-type heavy media vessels and the fine coal on concentrating tables in four parallel coarse coal and fine coal circuits. After cleaning, the coal undergoes additional processing, including crushing, sizing, mechanical dewater-

ing and heat drying before being loaded into railroad cars.

**One man in the main control room has at his finger tips some 90 per cent of the plant's operations.** Operators at four other control stations handle the dumping of raw coal from railroad cars, heat drying of fine coal, loading of clean coal into railroad cars and dumping of refuse in a deep valley almost half a mile away. The plant is so automatic that it requires only 16 men per shift, including greasers, oilers and mechanics.

Profitable use will be made of what is normally considered a waste material. A portion of the shale refuse will provide raw material for lightweight aggregate which will soon be produced in a plant Link-Belt is now building adjacent to the preparation plant.

Water, so important in the coal cleaning process, is circulated at the rate of 46,850 gallons a minute. A Link-Belt water clarification system recovers extreme coal fines from the water, which is filtered and treated and used over and over in a closed water system, thus conserving the plant's water supply and avoiding pollution of streams.

The modern machines and methods employed at the Moss No. 3 mine and preparation plant are expected to result in production of 45 tons of coal per man per day, compared with an average of 11 tons per man per day for the coal industry in the United States and one and one-half tons per man per day in Europe, according to J. P. Routh, chairman of the board of The Pittston Company.

#### *\$150 Million Development*

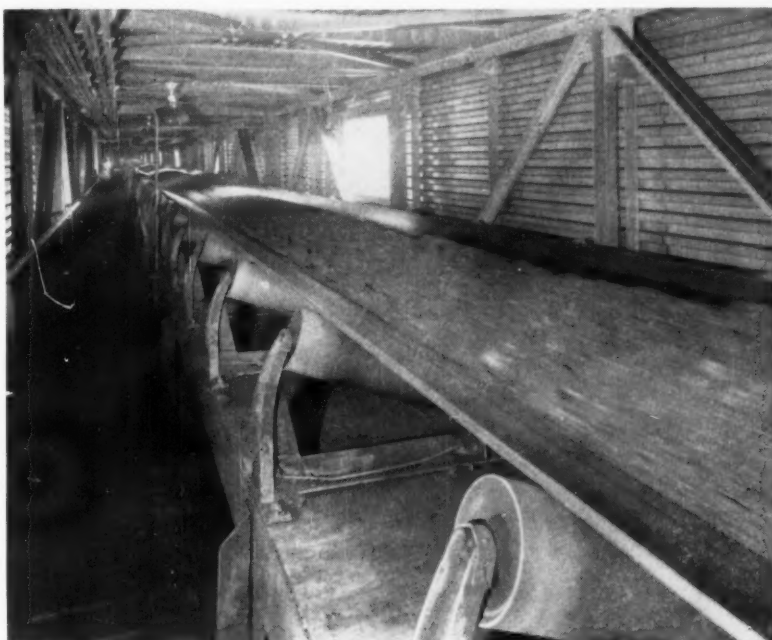
The Moss No. 3 mine is located in one of the largest and most valuable fields of virgin, unexploited metallurgical coal remaining in the United States. The Clinchfield properties in Virginia include approximately 300,000 acres, with coal reserves estimated at more than one billion tons.

Over 100 million tons of recoverable coal have been allocated to the Moss No. 3 mine, assuring a minimum life of 20 years. An addi-

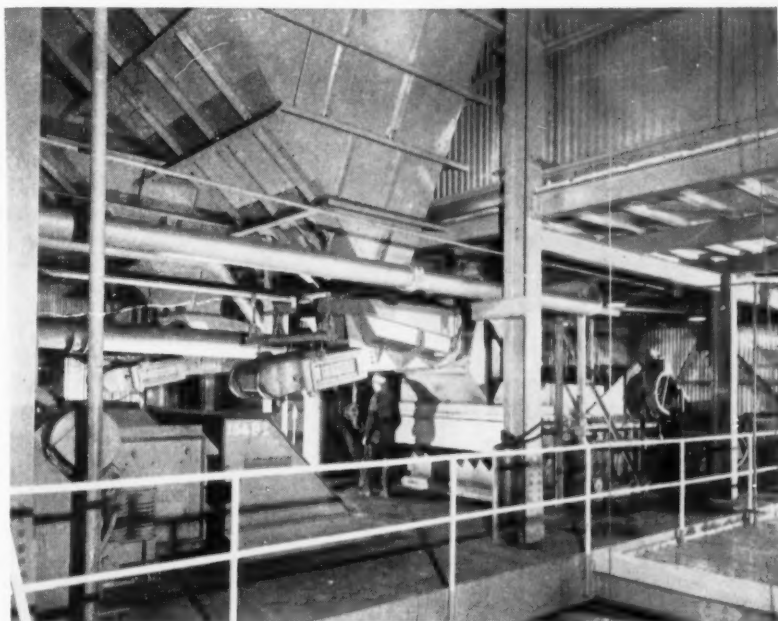
tional 100 million tons of the same seam, lying between Moss No. 2 and Moss No. 3, have been held in reserve for division between these two operations.

This Clinchfield expansion is

part of a \$150 million three-company industrial development program in southwest Virginia. Appalachian Power Company, a subsidiary of American Electric Power Company, has built a steam



Crushed raw coal flows constantly, hour after hour, at the rate of 1,500 t.p.h. over the 60-in. wide plant feed belt conveyor, which delivers coal from storage bin to a 200-ton surge bin at the top of the preparation plant or to a transfer belt conveyor leading to a 600-ton surge bin.



Start of the cleaning process begins when eight Syntron feeders beneath the surge bins deliver the raw coal to eight horizontal double-deck vibrating screens. These screens remove the fine ¼-in. by 0-in. coal by wet screening and pre-wet the 4-in. by ¼-in. coal.



generating plant at Carbo, Va. about three miles south of the Moss No. 3 plant. It will provide 450,000 kilowatts of additional power for the area and will consume some 1,200,000 tons of Clinchfield coal

each year.

The Norfolk and Western Railway has laid 16½ miles of branch line to serve these operations. The seven-mile line from the Moss No. 3 mine to the preparation plant

passes through a tunnel 8,240 ft. long, cut through a mountain to avoid laying 30 miles of track around it.

### *A Few Figures*

The main building of the Moss No. 3 preparation plant is almost the size of a football field, 287 ft. long and 156 ft. wide. The roof of the tallest structure is 113 ft. above ground level, or about ten stories high. About 900 ft. to the north is the rotary railroad car dumper, with delivery tracks for 202 railroad cars. Belt conveyors connect the dumper house with a crusher house and storage bin, and a long conveyor gallery runs from the base of the bin to the top of the plant.

To the west is the loading area, with eight railroad tracks, five for loading. The loading tracks have space for 222 cars.

Major equipment, in addition to nine tank-type heavy media vessels, includes 36 vibrating screens, three crushers, 64 Deister concentrating tables, five drag tanks, 12 centrifugal dryers, eight Multi-Louvre heat dryers, three thickeners and five vacuum filters.

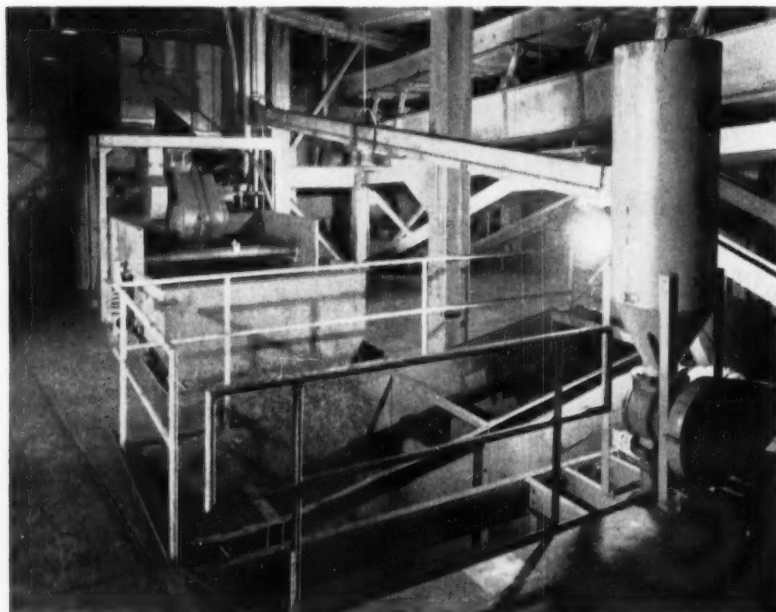
There are 14 vibratory feeders, 20 screw feeders, a reciprocating feeder, four oscillating conveyors, 30 flight conveyors, 32 screw conveyors and 22 belt conveyors. Total length of the belt conveyors is about 8,000 ft., with widths ranging from 24 in. to 72 in.

The plant has a total connected motor load of 13,650 h. p. It uses 562 electric motors, from fractional to 400 h.p., of which 23 are 200 h.p. or more. About 240 miles of wire and more than 12 miles of conduit were used. The plant has 600 push buttons.

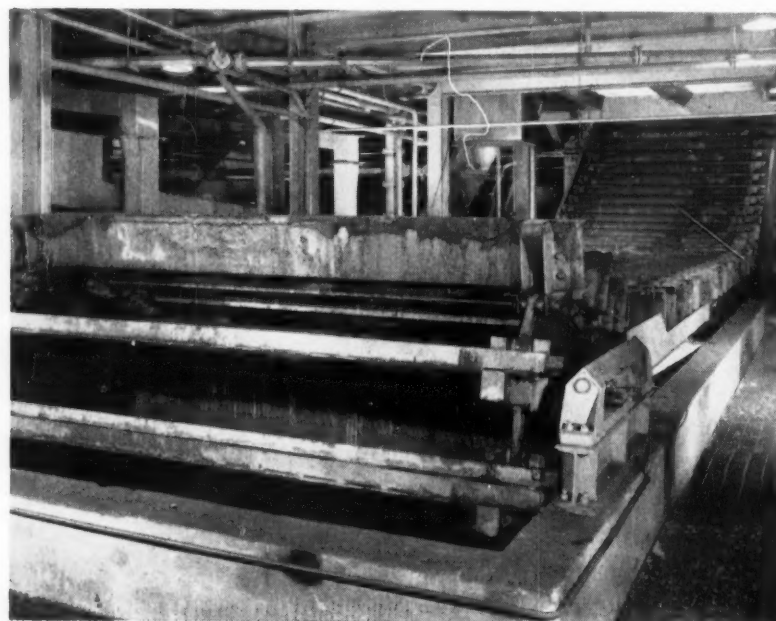
### *Operation of Plant*

Let's follow a typical ton of coal as it comes from the mine.

The ton of coal is one of 70 in a gondola car, which is dumped by a Link-Belt rotary car dumper. Operating on a 60-second dump cycle, the dumper unloads 22 cars in 45 minutes of each hour, with



The sink product of the primary tank-type heavy media vessel in background discharges into the horizontal vibrating screen at left for draining, rinsing and dewatering and then enters the secondary heavy media vessel in foreground. The float product of the secondary vessel is steam coal, while the sink product is refuse. Oscillating conveyor delivering feed to primary vessel is shown at upper right.



Clean coal and refuse are flumed to four clean drag tanks and one refuse drag tank. The ¼-in. by 100-mesh coal (and ¼-in. by 48-mesh refuse) settle in their respective tanks. The clean coal goes to centrifugal dryers, while the refuse goes to the refuse dewatering screens. Minus 100-mesh coal and minus 48-mesh refuse overflow the tank to clean coal and refuse thickeners.



the remaining 15 minutes devoted to switching trains into position.

From a 200-ton hopper beneath the dumper, the run-of-mine coal is carried to the crusher station by a 72-in. wide belt conveyor at the rate of 2,000 t.p.h. Here it is reduced to 4-in. by 0-in. size, and tramp iron is removed by a belt magnet. The crushed coal is delivered by belt conveyor to a 2,500-ton storage bin.

The coal is carried to the top of the preparation plant at the rate of 1,500 t.p.h. by a 60-in. wide inclined belt conveyor, being weighed electronically en route. It is deposited in a 200-ton surge bin or transferred by another belt to a 600-ton surge bin.

Coal is reclaimed from the surge bins by four pairs of Syntrol vibratory feeders to four pairs of double-deck horizontal vibrating screens. These screens scalp out slabby rock, remove the  $\frac{1}{4}$ -in. by 0-in. coal by wet screening, and pre-wet the 4-in. by  $\frac{1}{4}$ -in. coal.

After this initial separation, coarse and fine portions of coal proceed through the respective coarse and fine coal circuits.

#### Coarse Coal Circuits

The 4-in. by  $\frac{1}{4}$ -in. coal from each pair of vibrating screens is collected on a 48-in. wide oscillating conveyor for delivery to one of four tank-type primary heavy media vessels, which use the basic principle of float-sink separation in a magnetite and water mixture.

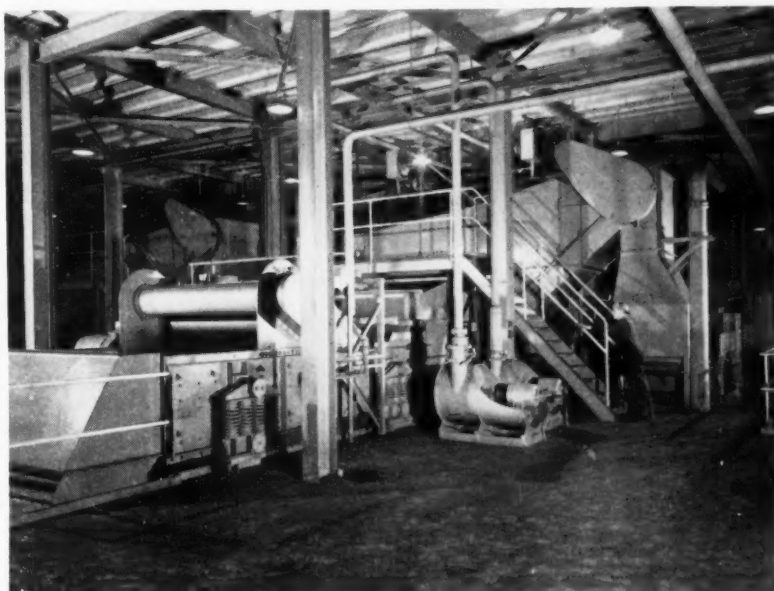
The coal floats across the bath and discharges with its carrying medium over a weir onto screens for draining the free medium back into the system and rinsing the magnetite particles from the coal. The heavy material sinks to the bottom and is removed by a double-strand flight conveyor. The sink material is drained in the same manner as the float material.

Each primary vessel has an approximate specific gravity of 1.35, producing a float product of clean high quality metallurgical coal and a sink product of refuse and steam coal.

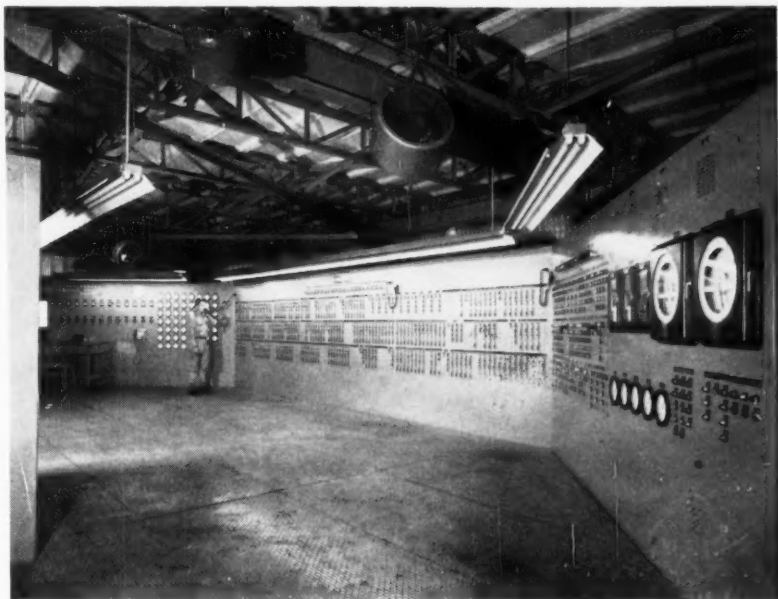
The sink product is drained, rinsed and dewatered on vibrating screens and then fed to four secondary tank-type heavy media vessels with approximate specific gravity of 1.50. The float product

of the secondary vessels is steam coal; the sink product is refuse.

A ninth tank-type heavy media vessel will be employed for further separation of the shale refuse to be used in production of light-



The clean metallurgical coal float product of each primary heavy media vessel is drained, rinsed, dewatered and sized by horizontal vibrating screen (foreground). The sink product, consisting of steam coal and refuse, is conveyed from the tank and discharged onto horizontal double-deck vibrating screen at right, and then to the secondary heavy media vessel.



Ninety per cent of machinery in preparation plant is controlled by a single operator in the main control room. This 80-ft long panel contains all push buttons, selector switches, indicating lights, ammeters, audible signal devices and other instruments for the "wet" portion of the plant. The operator starts up and shuts down the four parallel coarse and fine coal processing circuits, each consisting of primary and secondary heavy media vessels, vibrating screens, crushers, Deister tables, drag tanks, thickeners, filters, pumps and conveyors.

weight aggregate.

The balance of the refuse is collected and delivered to the slope belt conveyor for disposal.

The various fractions of clean coal are screened and crushed as necessary to provide the end products desired. Any fine coal in this system is delivered to the heat drying section of the plant.

#### *Fine Coal Systems*

Fine coal that passes through the

raw coal screens beneath the surge bins and enters the fine coal circuits is pumped from raw coal sumps to eight low pressure cyclones which remove part of the water from the coal. The fine coal is cleaned on 32 double-deck Diesler concentrating tables, eight for each circuit.

The clean coal from the tables in each circuit enters a drag tank. The  $\frac{1}{4}$ -in. by 100-mesh coal settles in the drag tanks and is conveyed

to 12 centrifugal dryers which serve all four fine coal circuits. The centrifugally dried coal is then conveyed to the heat drying section of the plant.

Minus 100-mesh material overflows from the drag tanks to one of two 130-ft. diameter clean coal thickeners which recover the fine coal solids and clarify the wash water for re-use. In the thickener the suspended coal settles out and is raked off the conical bottom, while the clarified water overflows and is returned to the plant for re-use. Each thickener has a capacity of 1,900,000 gallons.

The fine coal solids are pumped to three vacuum filters for dewatering. The filter cake is blended in a paddle mixer with crushed steam coal and delivered to the heat drying section.

Refuse from the tables travels through a single drag tank. The  $\frac{1}{4}$ -in. by 48-mesh refuse settles in the tank and is discharged to a dewatering screen and then to a refuse flight conveyor. Minus 48-mesh refuse is flumed to a 130-ft. diameter thickener which is identical to the clean coal thickeners.

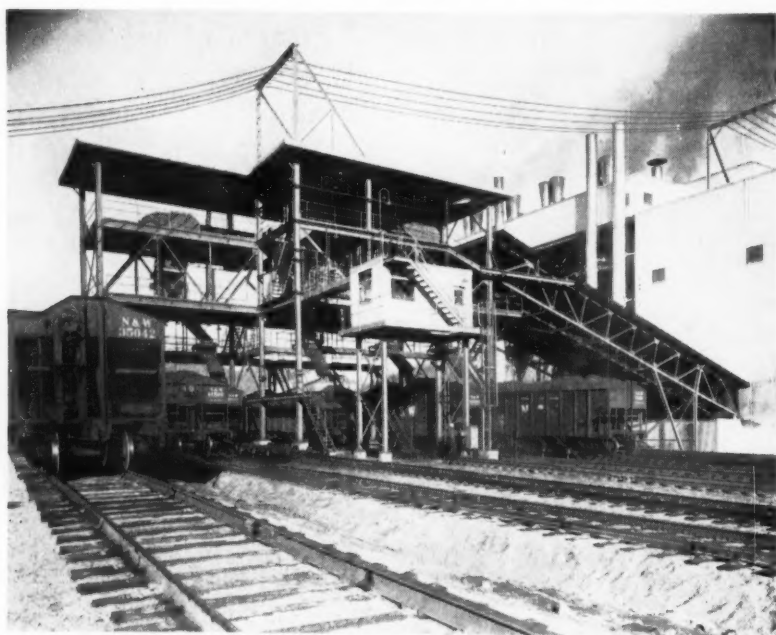
Refuse reclaimed from the thickeners goes to two vacuum filters, and the filter cake is conveyed to refuse disposal system.

#### *Heat Drying of Fine Coal*

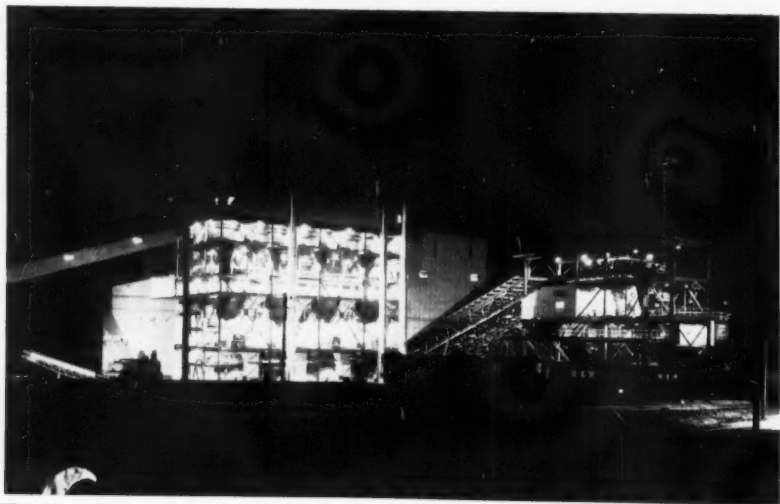
Eight Link-Belt Multi-Louvre dryers meet the exacting heat drying requirements for fine coal. Five of these dryers are normally used to dry fine metallurgical coal consisting of  $\frac{3}{4}$ -in. by  $\frac{1}{4}$ -in. coal from the heavy media process, together with the centrifugally dried coal from the fine coal system. Surface moisture is reduced to 2 to 3 per cent.

The other three dryers are normally used for the steam coal, reducing surface moisture to about 5 per cent. The dryers are fed from their surge bins by screw feeders with remotely controlled P.I.V. variable speed drives.

Exhaust gases from each dryer receive primary cleaning in dry dust collectors and final cleaning



Final step in the coal preparation plant is the loading of various grades of clean coal into railroad cars. Four loading belt conveyors carrying dried steam coal, sized coal, dewatered stoker coal and dried metallurgical coal load to five railroad tracks.



The Moss No. 3 plant has eight Link-Belt Multi-Louvre dryers for heat drying of fine coal. The dryer portion of the plant is not enclosed, except for the control room and wet scrubbers.



**NEW** CAT D7 SERIES D TRACTOR



Project Paydirt, a multimillion dollar research and development program on Cat-built products pays off for you in the most productive earthmoving equipment ever developed.

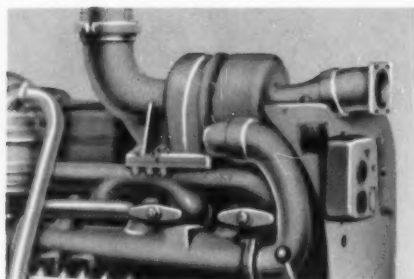
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TWO NEW MACHINES**

**NEW** CAT No. 933 SERIES F TRAXCAVATOR



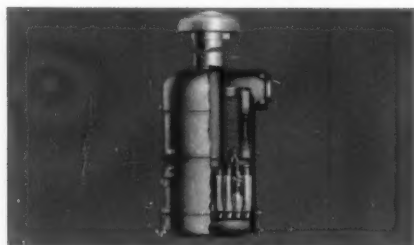
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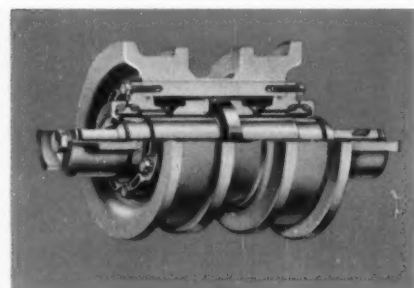
#### NEW TURBOCHARGED ENGINE

Develops 140 flywheel HP, 112 drawbar. Turbo-charger adds more horsepower with more efficient use of fuel. Improved torque characteristics increase tractor's lugging ability 80% over previous model. In-seat starting is available.



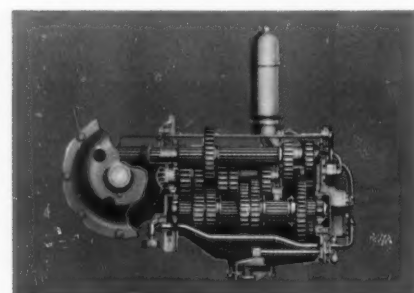
#### NEW DRY-TYPE AIR CLEANER

Cyclone tubes and re-usable cellulose filter element remove at least 99.8% of all dirt from intake air during every hour of operation, regardless of conditions. Cleaner can be serviced in 5 minutes. Prolongs engine life.



#### NEW LIFETIME LUBRICATED ROLLERS AND IDLERS

Exclusive floating-ring seals protect track rollers, carrier rollers, idlers—keep oil in, dirt out. No lubrication needed until rebuilding.



#### NEW TRANSMISSION AND FINAL DRIVE

Transmission bearings are pressure lubricated, oil is sprayed directly on gears and is full-flow filtered. Coarser pitch increases strength of final drive gear 49%, idler pinion 16%.

# NEW CAT D7 SERIES D TRACTOR

Look what's happened to the D7: it has more power—more features—more productive ability and operating economy than ever before! These advances make the new D7 an even better investment—way out in front of all others in its class.

The key new features to the improved performance of the D7 are: a new Cat Turbocharged Diesel Engine that produces 140 flywheel HP and 112 at the drawbar, new dry-type air cleaner, new lifetime lubricated rollers, new lubrication system for transmission, new stronger final drive gears, and optional in-seat starting.

The new D7 with its new engine and other developments are illustrated here—and there are many more. Look them over—then tell us when we can demonstrate the new D7 on your job.



#### SPECIFICATIONS

Horsepower, Engine .....	140
Drawbar .....	112
Engine .....	Cat Turbocharged Diesel
Clutch .....	Oil-type
Area of ground contact, standard 20" shoes .....	3775 sq. in.
Operating weight (approx.) .....	27,230 lb.

**ATTACHMENTS:** Straight, Angling or No. 7G Bulldozers, Lowbowl Scrapers, Hydraulic or Cable Controls.

**TO INCREASE YOUR PROFITS LOOK**



# NEW

## No. 933

### SERIES F

### TRAXCAVATOR

New power... new capacity... new features... new ruggedness make the new No. 933 Series F Traxcavator a bigger producer—up to 22% better than ever before! Now it will work more cycles per hour—handle more yards per day—give you more ease of operation—and deliver you more profit than any other excavator-loader in its class! The Series F has many new features; here are just a few: new, larger bucket, new engine, many new operator comfort features and new power train. See the new No. 933 at our headquarters; see it in action on your job and in your materials; try out the controls yourself. Make every comparison. Match the No. 933 against anything in its size. You'll be convinced: here's the most excavator-loader for your money!

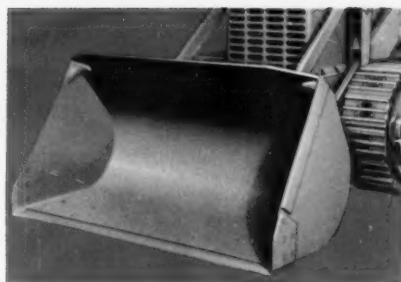


#### SPECIFICATIONS

Standard bucket.....	1½ cu. yd.
Dumping reach (45° discharge angle).....	31½"
Dumping height (center of hinge pin to ground).....	9' 11¼"
Tilt back at ground level.....	40°
Operating weight (approx.).....	16,350 lb.

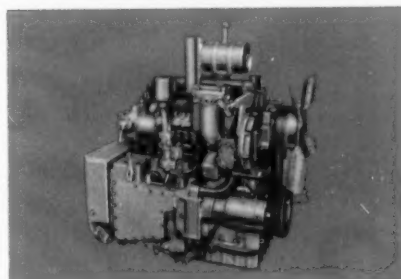
**ATTACHMENTS:** Straight or Angling Bulldozers, Specialized Buckets as the exclusive Side Dump, Log and Lumber Fork.

TO **CATERPILLAR**



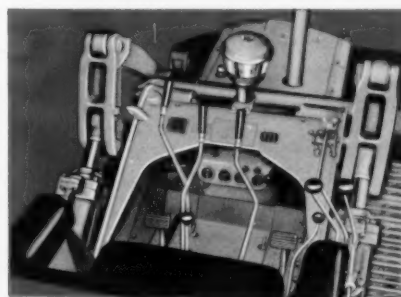
#### NEW 1½ CU. YD. BUCKET

12½% larger bucket than on the Series E. Matching increased capacity are longer bucket reach and greater digging depth.



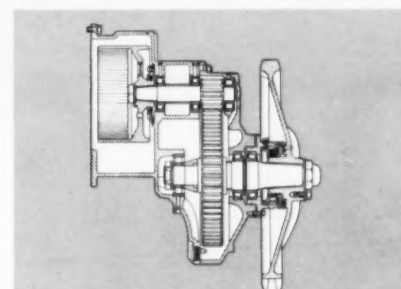
#### NEW 52 HP ENGINE

New power plant is shorter, more compact. Individual fuel pump barrels and plungers fit directly into single fuel pump housing for simple, unit servicing. New engine balancers give smoother operation.



#### NEW OPERATOR COMFORT

Convenient grouping of easy operating controls and instruments—ample leg room—new, comfortable seat—all contribute to greater operator comfort.



#### NEW POWER TRAIN

4 forward speeds (1.51 to 5.48 MPH) and new, 3.67 MPH reverse boost production. Improved, stronger, heavier final drive gears assure life to match increased machine capacity. Time-proved, dependable oil clutch is standard.



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**CATERPILLAR'S  
PROJECT  
PAYDIRT**

**IN ACTION!**



Over the past few months, you've seen examples of Project Paydirt in action: the *new* No. 14 Motor Grader—*new*, more powerful D8 Tractor—*new* DW20 and DW21 wheel Tractors, *new* No. 435, No. 456, No. 470, No. 482 Scrapers, *new* lifetime lubricated rollers—*new* dry-type air cleaners.

These—and many more new products to come—are the answer to your demand for more productive equipment that will help keep you ahead of competition, move more dirt at lower cost.

Call us! We're ready to demonstrate how Project Paydirt developments can increase your profits!

# CATERPILLAR

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1356 E. 12th St., Erie, Pa.  
Route 219 North, Somerset, Pa.  
Buckhannon Pike — Route 20, Clarksburg, W. Va.

## OHIO MACHINERY CO.

6606 Schaaf Road, Cleveland, Ohio  
930 Kinnear Road, Columbus, Ohio  
2807 Reynolds Road, Toledo, Ohio  
U.S. Route 250, Cadiz, Ohio  
4000 Lake Park Road, Youngstown, Ohio

## WALKER MACHINERY CO.

1545 Hansford Street, Charleston, W. Va.  
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☐ New D8 Tractor      ☐ New No. 14 Motor Grader  
☐ \_\_\_\_\_  
(other)

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FIRM \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_

by wet scrubbers, with dust reclaimed either to dried coal conveyors or the furnace fuel feeder.

#### *Sampling and Car Loading*

All coal fractions from the coarse and fine coal systems are collected on four belt conveyors which deliver to five railroad loading tracks. Dried steam coal is normally loaded on track 1 but can also be loaded on track 2. Sized coal is loaded on track 2. Dewatered stoker-size coal is loaded on track 3, and dried metallurgical coal is loaded on tracks 4 and 5.

Separate, fully automatic sampling equipment is provided for both the dried steam coal and dried metallurgical coal ahead of the loading facilities. Each system includes a primary cutter, vibratory feeder, sample crusher and a secondary feeder with cutter.

A common sampling system is provided for the dewatered stoker-size coal and sized coal, consisting of a primary sample cutter for each belt and a common primary sample bucket which transfers the sample to the sampling column.

#### *Refuse Disposal System*

Rock, shale and other plant refuse, except for the shale to be used as raw material for the lightweight aggregate plant, is disposed of in a deep valley on the other side of a hill behind the plant. The refuse is collected on a 36-in. wide belt conveyor which carries it 2,400 ft. up a slope. The belt is driven by a 400-h.p. motor through a D-250 parallel shaft speed reducer.

An unusual feature of this belt conveyor is an arrangement by which the belt is turned over after discharging material, so that on the return run the top side of the belt is up. This avoids build-up of material on the return idlers. At the bottom of the run the belt is turned again to its normal position.

The refuse disposal system is designed as a flexible system that can be adjusted as the pile grows. The slope belt discharges to a tower boom stacker which can be

rotated in a wide arc and lifted up or down to discharge the refuse in the direction desired. At present this stacker is discharging directly into the valley.

However, a rail-mounted 36-in. trailing belt conveyor designed for sectional extension to a maximum length of 600 ft. will be installed in the near future. This conveyor will discharge to a traveling fixed boom stacker which will have a 70-ft. radius of swing and a traversing speed of 6 f.p.m.

The plant was furnished by the Link-Belt Pershing Road plant in Chicago. The Link-Belt Colmar, Pa., plant furnished the thickeners.

● Jack A. Hasten, District Representative in the Central Sales Division of Caterpillar Tractor Co. since 1957, has been named supervisor of the Track-Type Tractor Section of Sales Development at Peoria, the company announces.

A graduate of the University of Notre Dame, Hasten has been associated with Caterpillar since 1942. He served for the past two



**JACK A. HASTEN**  
Caterpillar Tractor Co.

years as district representative in the sales territories of Burford-Toothaker Tractor Co., Montgomery, Ala., and Thompson Tractor Co., Inc., Birmingham, Ala. Prior to that he served for three years as Engine Representative in the Central Sales division.



Ditching work with a motor grader requires power and high production, both of which are features of the new Caterpillar No. 14 Series B Motor Grader. High production is assured through a balanced relationship of size (19' 2" wheelbase), weight (29,050 pounds), and horsepower (150 hp turbocharged engine). Adequate traction is assured by the 22,000 pounds of weight resting on the drive wheels. A large capacity 12-foot moldboard, 27 inches high, is coupled with forward travel speeds ranging from 2.6 to 21.6 mph. Other production boosters standard on the No. 14 include power assisted brakes, power steering and a new positive mechanical lock on the power controls. The complete range of blade positions, including the 90° maximum bank cutting angle has been retained.



## Modern Equipment At Industrial Coal Company

● Like all other progressive coal strippers, the Industrial Coal Company of Lisbon, Ohio, has continuously progressed toward the use of late type stripping machinery. At its operation lying just South of Lisbon, the Industrial Coal Company is stripping with a Model 4500 Manitowoc dragline and 6 yard bucket and a Model H-D 21 A-C tractor. The Ohio number 6 seam of coal running 32 inches thick is being stripped. Overburden consists of sand and lime rock. Up to 35 feet of overburden is being moved.



### LONG INTRODUCES UTILITY CAR

● "Inspector's Friend" is the name of a new multi-purpose utility car that is now being manufactured by the Long company, Oak Hill, W. Va.

This new 3-wheeled, rubber-tired vehicle is battery operated and is designed for certain types of personnel transportation and light supply handling. With a capacity of 500 pounds plus operator, it's especially suitable for such applications as:

travelling between belt drive unit and the face; transportation for maintenance force, supervisory and engineering personnel; supplying items to the face during the working cycle, and assisting in rock dusting.

Although the "Inspector's Friend" is similar to the small mobile personnel cars used so widely in large industrial plants, it's been specifically designed to include a number of features required for coal mine use. It can be maneuvered readily in

tight quarters, will operate two full shifts between battery charges, is available in either open or permissible type electrical construction, and is made in three tramping heights (24", 36", and 60") for operating in both low and high coal. Other specifications are: width-52 $\frac{7}{8}$ "; length-103 $\frac{1}{8}$ "; speed-4 miles per hour.

For additional information on the LONG "Inspector's Friend," write manufacturer at P. O. Box 331, Oak Hill, West Virginia.



## Can You Afford Good Haul Roads In Your Stripping Operations?

● Practically everyone agrees that good haul roads in stripping operations pay substantial dividends in increased production, greater operator safety and comfort and less equipment maintenance.

In the past several years there has been a trend toward use of larger, faster vehicles in an attempt to keep hauling costs down. But heavy loads at high speed tax haul roads, demanding solid footing, shallow grades, gradual curves and good traction.

Contrary to many guesses, such coal mine roads are not an expensive luxury which only a few can afford. Improved roads can pay for themselves many times over. The big question is: How much can you afford to put into haul road improvements?

To find the answer to that question you must:

1. Determine the increase in production which would result from the contemplated improvements made possible while retaining present production.
2. Determine the saving which would accrue from the improved production rate.
3. Decide whether the improvement can be made for a cost equal to or lower than the savings which would be generated.

Improving the condition of a mine's haul road — reducing its rolling and grade resistances and eliminating sharp curves—can result in faster travel speeds. Under most conditions, rolling resistance can be reduced by providing good drainage to reduce formation of ruts, by mechanical compaction, by using a rock base where required, or by employing stabilizing additives, such as calcium chloride, cement, oil, etc. Frequently production gains will justify cutting



Equipment already owned can do most of the work of improving haul roads. This tractor-scraper team, for example, can be used in hauling fill for chuck holes and other depressions in the road.



New Cat No. 14 Motor Grader is shown at work on a haul road. Improving rolling resistance of a haul road will pay off in greater operator safety and comfort, faster cycle time and less equipment downtime.

through or building a road around such grades. Hazards and bottle-necks caused by sharp curves may be profitably removed, or at least eased

Probably the most common problem, however, is that of rolling resistance. Ground condition and load primarily effect rolling resistance—the deeper a wheel sinks into the ground, the higher the rolling resistance. Other factors, such as internal friction and tire flexing, also must be accounted for. As a result, experience shows that a minimum rolling resistance of 40 lbs. per ton of weight on the wheels must be overcome just to move the machine. For each one inch of tire penetration, an additional 30 lbs. per ton of weight must be overcome.

Therefore, to estimate rolling resistance requirements, the following formulas may be used:

Total RR—RR factor (lbs./ton) X Wt. (tons) on Wheels  
Where

RR Factor—40 lbs./ton X 30 lbs./tons (for each 1 inch penetration)

With this formula in mind, we may now determine what increase

in production would result from a given improvement.

To illustrate, assume that you plan to improve a one-mile section of haul road at a strip mine by decreasing rolling resistance from 100 to 75 pounds per gross ton of weight. Your coal hauler has a gross weight of 72.5 tons, including a 45 ton payload, and its present cycle time is 15 minutes.

#### *Current Haul Road Condition*

Rolling resistance factor of 100:

Total RR—100X72.5—7,250 lbs. rimpull required.

(Based on this rimpull, speed of a Cat DW20 Tractor—Athey PH20 Coal Hauler—would be about 10 mph.)

Total Travel Time—

5,280 ft. —6 min.

10 mphX88 ft./min.

Production (tph)—

45 tons/cycle X 45 min.—hr.

15-min./cycle

—135 tph

#### *Improved Haul Road Condition*

Rolling resistance factor of 75:

Total RR—75X72.5—5,440 lbs.

rimpull required.

(Based on this rimpull, travel speed of a Caterpillar DW20 Trac-

tor—Athey PH20 Coal Hauler—would be 12.9 mph.)

Total Travel Time—

5,280 ft. —4.6 min.

12.9 mph X 88 ft./min.

Time Saved—6 min.—4.6 min.—1.4 min.

New Cycle Time—15 min.—1.4 min.—13.6 min.

Production (tph)—

45 tons/cycle X 45 min.—hr.

13.6 min./cycle

—148 tph.

Thus it can be seen that lessening rolling resistance on one mile of haul road will yield an increase in production of 13 tons per hour—without additional equipment.

To determine the savings which would result from an improved production rate we must compare hourly equipment costs with hourly production.

Assuming hourly owning and operating cost of the coal hauling equipment to be \$16.46, at a production of 135 tph, then cost per ton would be:

\$16.45—135 or \$12.19

Using the same equipment cost but the increased production figure of 148 tph, cost per ton would be:

\$16.46—148 or \$11.12

This represents a saving of \$1.07/ton. On the basis of one million tons hauled annually over the improved road, a 2.9 mph gain on one mile of haul road would justify an expenditure of up to \$10,700 on haul road improvements.

In addition, you can use equipment you already own to accomplish most of the road improvement. Scrapers and bulldozers can supply the fill. A motor grader can crown the road and cut highly-necessary drainage ditches. After the road has been put in good shape, only occasional passes of the motor grader will be necessary to remove bumps, fill slight depressions, and clear small bank slides.

Good haul roads will more than return their value to a coal mine operator in increased production, greater safety and lower costs of of operation and maintenance.



A Caterpillar No. 12 Motor Grader equipped with moldboard is maintaining 3½ miles of haul road on coal mining operations, east of Albright, West Virginia. This machine can cover this distance in approximately 4-hours.

## Most Stripping Done With Tractor At Phillips Coal & Coke Co.

● There is not much Beehive coke made in Fayette County, Penna. any more due principally to exhaustion of the Connellsville Coking Coal Seam. In the Southern end of that County, near McClellandtown, the Redstone coal runs about 32 inches in thickness and is generally high enough in quality to make a suitable coke. The Phillips Coal & Coke Company is stripping the Redstone seam for Coke making purposes, using a International TD-24 tractor to push most of the overburden off the coal. The harder overburden is stripped with a Lorain Model 75 shovel with spoils onto the coal seam. The spoil from the shovel is then pushed to the spoil bank by a International TD-14 tractor.



Over-all view of the operation. The TD-24 in foreground is stripping overburden. The Lorain shovel can be seen directly behind this tractor.



TD-18 pushing overburden spoiled by the shovel.

● The 1959 National First-Aid and Mine Rescue Contest will be held at the Buffalo Memorial Auditorium, Buffalo, N. Y., Oct. 5-7, the General Contest Committee has decided. This contest is under the sponsorship of the Joseph A. Holmes Safety Association in cooperation with the National Coal Association, United Mine Workers of America, State mining departments, local mining institutes, and

coal operators' associations. The banquet, at which winners will be announced and prizes awarded, will be held on the last day at the Statler Hilton, the contest headquarters. Harry Gandy, Jr. of NCA's staff is chairman of the Contest Arrangements Committee and also its treasurer.

● The retirement of Charles M. Shoffner as chief executive officer

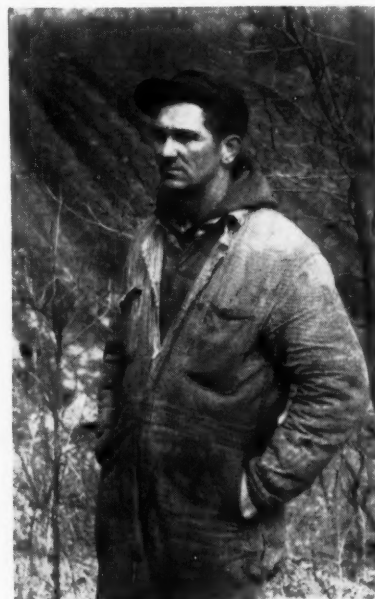
of Pittsburgh and Shawmut Coal Co. and Allegheny River Mining Co., at Kittanning, Pa., was announced. Mr. Shoffner, who had served the companies 23 years, will devote his time to his group of Ringgold companies engaged in coal production and sales in central and western Pennsylvania and northern West Virginia, and to other business properties in Kittanning.





## Tractors Strip All Overburden At Collins & Walton Coal Company

● Operated now by two sons of one of the founders of the Collins and Walton Coal Company, Earl and Everet Walton are moving all overburden off coal in the vicinity of Welston, Ohio, with two Allis Chalmers HD-19 and three HD-21 tractors. Up to 20 feet of overburden is moved. Stripped ore is back-filled by the tractors and the reclaimed area is planted in tree and grass.



Everet Walton



## TRACTORS STRIP ALL OVERBURDEN AT COLLINS AND WALTON COAL COMPANY



The International Model 495 Paywagon — one of the three new earthmovers just announced by International Harvester Company. The 27-cubic-yard machine has a heaped capacity of 40.5 cubic yards.

● Dowty Mining Equipment Ltd., England, has developed a new hydraulically-powered self-advancing roof support system for safer and more efficient room-and-pillar mining.

The new system, called the

Dowty Canopy, provides constant protection for the continuous miner and support teams. The system is released, advanced and reset by simple valve controls. Operation of the Canopy is rapid, promoting maximum productivity.

The Canopy system consists of two twin-section support units interconnected by a framework of longitudinal and transverse roof beams. The rear section of each support incorporates three hydraulic props, and its base houses a double-acting hydraulic jack, the rod of which is attached to the rear end of the front support section. This incorporates two hydraulic props. Valve boxes control setting and release of the props, and extension and closure of the jacks.

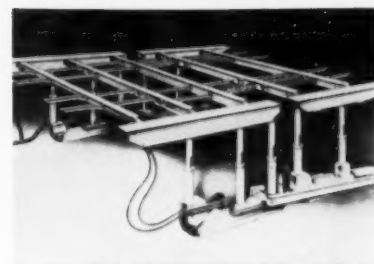
To advance the system, the front section of one support is released from the roof and thrust forward by closure of the hydraulic jacks, section. It is then reset, and the front section of the second support advanced in a similar manner. The rear section of the first support is next released, hauled forward by closure of the hydraulic jack, and reset to the roof, the cycle being completed by similarly advancing the rear section of the second support.

By advancing the support sections alternately, effective roof support is continuously maintained, affording complete protection throughout all stages of advance. Roof bolting can also be carried out from the protected area.

All control points are readily accessible and valve operation is simple. Floor penetration is minimized by the large basal areas of the supports.

A working model of the Dowty Canopy will be exhibited at the Cleveland Coal Show, May 11-14. (Booth No. 2665)

Additional information on the Dowty Canopy may be obtained from Dowty Mining Equipment Ltd., Ajax, Ontario, Canada.



Dowty Canopy

## Formal Opening Of Keystone Diesel Engine Co., Inc.

● Formally announcing its opening, the Keystone Diesel Engine Co., Inc. held open house Friday and Saturday, February 27 and 28. Located on Route 19 in Wexford, Pennsylvania, about 14 miles North

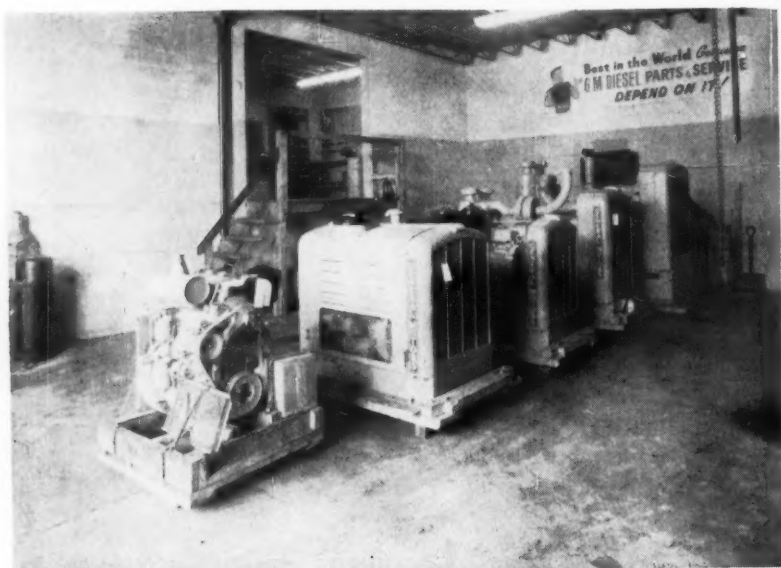
of Pittsburgh, the Keystone Diesel Engine Co., appointed distributor for General Motors Diesel engines, will sell and service in 31 Counties in Western Pennsylvania. A fleet of trucks is on call at all times to

service industrial petroleum, Marine and truck engines and Hydro-starters. A repair and rebuilding shop equipped with latest injector rebuilding and precision overhauling is also available.

This new organization is headed by Art Boseti, former regional manager for Detroit Diesel Engine Division of General Motors, has had 15 years experience in this region. Frank Chase, Jr. Vice-president and Sales Manager was manager and applications engineer for 15 years with the Highway Equipment Co. Highlighting the occasion was the first showing in this region of the new series 53 engines of the General Motor Diesel line.



Over-all view of the office and showroom.

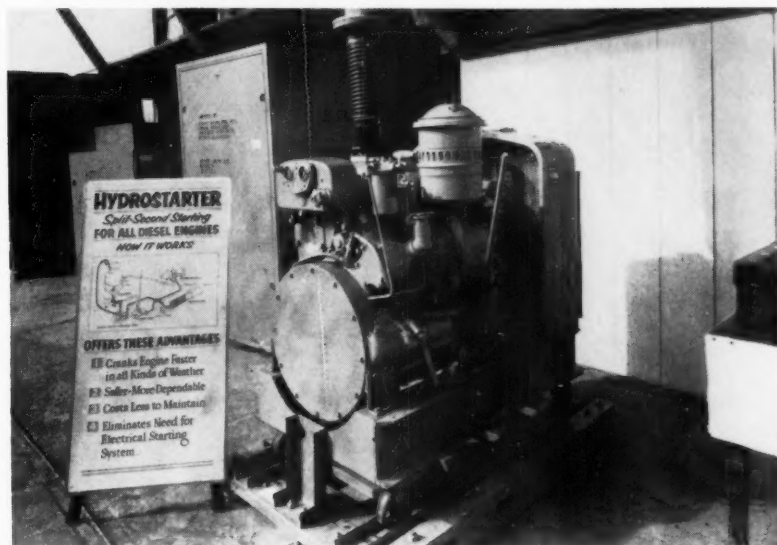


Various size engines in stockroom. Over-all view of office and show room.



Owners are: Art Boseti, right, President and Frank Chase, left, Vice-President.

# FORMAL OPENING OF KEYSTONE DIESEL ENGINE CO., INC.



Hydrostarter, split-second starter for all Diesel engines, was on display.

● Addition of a new No. 933 Series F Traxcavator to its line has been announced by Caterpillar Tractor Co. Designed as an all-around digging and loading tool, the new machine has several efficiency-increasing improvements over the former model.

Features of the machine are a completely new engine, new, stronger power train, larger-capacity bucket and an operator's compartment built for maximum comfort.

The new four cylinder engine, rated at 52 flywheel HP, differs considerably from the former engine. A compact fuel pump housing contains the barrel and plunger assemblies, a new, round fuel rack and a horizontal actuating governor, all in one unit. Permitting easier adjustment and longer wear for all parts, the housing requires less space alongside the engine. Exclusive, capsule-type fuel pumps are retained for easy maintenance. Truly modern in design, the 4 in. bore x 5 in. stroke engine is 350 lbs. lighter and nine inches shorter. In addition, it is equipped with a dynamic balancer to minimize engine vibration, resulting in a smooth-running power plant.

Other noteworthy engine features include the use of cam-ground

pistons, requiring only 3 rings and substantially improving oil control; improved valves and head, incorporating a short valve train which lessens valve weight and increases the life of camshaft lobes; and a new starting engine, having, as standard, a pressure lubrication system common with the diesel engine.

Service life of the power train for the No. 933 Series F has been lengthened by several important modifications. The bottom of the bevel gear and transmission compartments has been increased in thickness to boost rigidity and strength. An improved brake offers full-contact braking with 30% less operator effort; new access doors are provided for easier, faster servicing of the brake parts. Final drives have been strengthened through use of wider, heavier teeth on pinion and gears.

Outboard pinion bearings are of a high capacity type. Easier service is provided by pressing on gears and locking them in place with a retainer nut. Unfastening the nut provides immediate removal of the entire assembly.

Use of a new cluster gear in the transmission provides a new, high-speed reverse for faster backing. With a reverse speed of 3.67 mph

(up from 3.04 mph on the previous model), the No. 933 Series F offers faster cycle times and more economical production.

The most significant change in the shovel portion of the No. 933 Series F is the increased bucket capacity. A new, 1 1/4-yard heavy-duty bucket is standard, replacing the former 1-yard bucket. With the increase in bucket capacity, combined with higher reverse speed, the new No. 933 has been able to gain an overall production increase of up to 20% in jobs ranging from basement digging to loading loose stockpile material. Operating studies have shown that the larger bucket can be fully loaded in the same time as the 1-yard unit—a finding which tends to prove its easier loadability.

To facilitate easier operation in demanding terrain, ground clearance has been increased 2 inches, to 12.5 inches.

Operator comfort has been increased on the new No. 933 with the addition of a seat comparable to those used on the Company's larger Traxcavators. Use of an easy-to-read instrument panel and relocation of the air clearer on the rear of the engine play a part in increasing comfort. Coupling these changes with the new, smooth-acting brakes means less operator fatigue and more working time each day.



The new Caterpillar No. 933 Series F Traxcavator incorporates a lighter-weight engine rated at 52 flywheel horsepower, an improved power train, and a bucket with 12 1/2% larger capacity than that on the previous model.

**308,822 yds. a month**  
in first quarter 1959, working 572 hrs. a month



Page Diesel Model 726, with 12 yd. bucket and 150 ft. boom, has averaged over 300,000 yds. a month for five years in overburden averaging 80 ft.—Sandstone, shale and limestone.

Have you ever seen such yardage — in such tough overburden?

It takes a Page to do it. Unusually fast swing, and correspondingly fast hoist line, adds up to quicker cycles and **MORE YARDAGE.**

And the rugged strength that's built into these machines is giving owners the least downtime, and lowest maintenance per yard, they've ever had.

Get our estimate of your own stripping costs with a Page. Write, wire or phone —

**FRANK SWABB EQUIPMENT COMPANY**

Hazleton National Bank Bldg., Hazleton, Pa.

Phone GLadstone 5-3658

For High Production and Lowest Operating costs—

**NOTHING equals this PAGE 700 series**

**SINGLE DECK WALKING DRAGLINES**



**Parts**

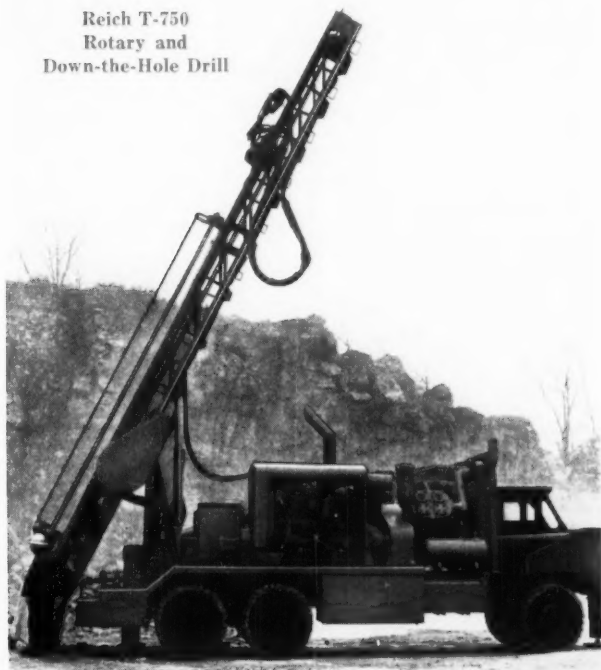


# Prove it **ON YOUR OWN** **WORK** ... side-by-side with your present equipment

We're GLAD to demonstrate! If the Reich doesn't *out-drill any other rig you may have* — pound for pound of weight, and dollar for dollar of investment — we won't expect you to be interested.

Drilling blast hole in hard sandstone and shale, owners report up to 80% more hole with the Reich, than with other rigs of same rating. That's why you see so many of the largest and most successful coal companies using the Reich.

Reich T-750  
Rotary and  
Down-the-Hole Drill



Reich C-850  
Rotary and  
Down-the-Hole Drill



FOR BIGGEST PRODUCTION,  
you need the Reich's —

**Exactly Right Drilling Speed** in every stratum (it is the only hydraulic rotary giving ANY speed of rotation); **Fastest Stem Loading**, just a few seconds; **Easiest Operation**, with minimum levers, hydraulically actuated. A real one-man rig.

For Demonstration write, wire or phone —

**FRANK SWABB EQUIPMENT CO.**

Hazleton National Bank Bldg.  
Hazleton, Pa. Phone Gladstone 5-3658

Your **SAFEST** way of buying a **REICH**  
is our **SUREST** way of selling it



Highway service crew, Pittsburgh. Ernie Sarver, shop superintendent, is in center front.



Pittsburgh parts department staff. Al Bischoff, parts manager, is in center front.



# Parts and Service

**Parts and Service are of first importance on every job.**

**And—one of the big reasons why more and more leading contractors and mine operators depend on Highway for all their equipment needs, is Highway's superior parts and service.**

AA-9008



Highway's parts departments meet every need of every customer.

Part of Pittsburgh service truck fleet. A similar fleet is maintained at Du Bois.

## Highway



**HIGHWAY EQUIPMENT COMPANY**

6465 Hamilton Ave. • Pittsburgh 6, Pa.  
40 Hoover Ave. • Du Bois, Pa.

Allis-Chalmers • Lima Shovels, Cranes, Draglines • Master  
Thor • Gar Wood • Lima Roadpackers  
Jaeger • Rogers Trailers • Heltzel  
Buffalo-Springfield • Tractomotive

# NO GIMMICKS - - - NO GIVE-AWAYS

## THE TRUTH IS

We're overstocked on Mining Equipment, Rails, Copper Wire, and supplies.

If you can use such items NOW is a good time to contact us. J. T. FISH assures you of a FAIR deal ALWAYS

WE OWN WHAT WE ADVERTISE

### JOY EQUIPMENT—REBUILT

- 3—Joy 14-BU Loaders, low pedestal, 7AE
- 2—Joy 14BU Loaders, medium pedestal, 7RBE.
- 1—Joy 14-BU Loader, high pedestal, 7CE.
- 6—12BU/10E Joy Loaders complete with Piggy Backs.
- 2—Joy 12BU Loaders, 9E, latest type.
- 1—Joy 12BU Loader, 220 volt AC.
- 1—Joy 20BU Loader, latest type.
- 1—Joy 11BU Loader, latest type.
- 2—Joy 8BU Loaders, 250 volt DC.
- 1—Joy 8BU Loader, 31" overall height.
- 2—Joy 8BU Loaders, 220 volt AC.
- 1—Joy curved Bar Head, complete.
- 6—Reliance 24-J Motors, 7½ H.P.
- 4—Reliance 10-J Motors, 5 H.P.
- 20—9-J Motors, 4 H.P.
- 3—New Wheel Units for Joy 6SC Shuttle Cars.
- 1—Goodman 660 Loader on cats, excellent.
- 1—Goodman 665 Loader on cats, latest type.
- 1—Goodman 865 Loader, 26" high.
- 2—Joy 6SC Shuttle Cars, rebuilt.
- 3—Joy 6SC Shuttle Cars, latest type.
- 2—Joy 6SC Shuttle Cars, rebuilt.
- 2—Joy 32E9 Shuttle Cars.
- 1—Joy 32E10 Shuttle Cars, rebuilt.
- 2—Joy 32E15 Shuttle Cars, rebuilt.
- 4—Joy 32E16 Shuttle Cars, rebuilt.
- 2—Joy 42E16 Shuttle Cars, rebuilt.
- 8—Small rubber tired Shuttle Cars.
- 3—Low Vein Rubber Tired Tractors.
- 1—Joy CD-22 Drill, like new
- 4—Joy T-2.5 low pan Cat Trucks.
- 1—Joy T-2.6 low pan Cat Truck with reel.
- 2—Joy T-1 Standard Cat Trucks, 220 AC.
- 1—Joy T-1 Standard Cat Truck, 250 DC.
- 4—Joy 11-B Cutting Machines, like new, 35 and 50 H.P.
- 1—Joy 7-B Cutting Machine, like new, 250 volt DC.
- 2—Goodman 212 Cutting Machines, 19" high.
- 4—Goodman 312 Cutting Machines, 17" high.
- 3—Goodman 412 Cutting Machines, 19" high.
- 2—Joy 7-B Cutting Machines, 220/440 volt AC.
- 1—Goodman Machine on Cats, 31" high. All hydraulic.
- 6—Goodman 512 Machines with Bugdusters.
- 1—Goodman 512 Cutting Machine, perfect.
- 1—Goodman 512 Cutting Machine, 220/440 volt AC.
- 3—Goodman 112 Cutting Machines, 220/440 volt AC.
- 1—Lee Norae low vein Machine Carrier on rubber.
- 1—Jeffrey 70 URB rubber tired Cutter. Universal head, perfect condition.
- 1—Joy 11RU Rubber Tired Cutter, with bugduster, Universal head, like new.
- 1—Sullivan 7AU on rubber, Universal Head.
- 2—Jeffrey 29UC Cutting Machines, Universal head, cuts anywhere in seam, 38" high, on cats, 250 volt DC.

### LOCOMOTIVES

- 1—Goodman 6 ton, 91-A, 27" high, armor plate frame
- 2—Jeffrey 13 ton, type MH-110, 36", 42" and 44" Ga.
- 2—Jeffrey, 10 ton, type MH-110, 42" and 44" Ga.
- 1—Jeffrey MH-124, 6 ton, 24" overall height.
- 12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" Ga.
- 4—Jeffrey, 8 ton, type MH-100, 2½" armor plate frames.
- 1—Jeffrey, 6 ton, type 2186, 22" above rail.
- 3—Jeffrey, 4 ton, type MH-56, 42", 44" and 48" Ga.
- 1—G.E., 4 ton, type 825 Locomotive, 22" high.
- 10—G.E., 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
- 1—G.E. 8 ton, type 822 Locomotive, 44" Ga.
- 3—G.E. 10 ton, type 809 Locomotives, 42", 44" and 48" Ga.
- 2—Goodman, type 33, 6 ton, 44" and 48" Ga.
- 3—Goodman, 8 ton, type 32A, 36", 44" and 48" Ga.
- 3—Westinghouse, type 902, 4 ton, 42" and 48" Ga.
- 2—Westinghouse, type 904, 6 ton, 44" and 48" Ga.
- 2—Westinghouse, type 906, 44" and 48" Ga.
- 2—Westinghouse, type 907, 10 ton, 44" and 48" Ga.
- 8—Jeffrey MH-78 Locomotive Units, cheap.
- 3—Plymouth Diesel Locomotives, 8 and 10 tons, 42" and 44" Ga.

### Locomotives (Cont.)

- 4—Jeffrey MH-88 Locomotive Units, real bargains.
- 6—Jeffrey MH-100 Locomotive Units, reasonable.
- Locomotive Trucks and Spare Armatures for all the above.

### TIPPLE EQUIPMENT

- 5—Complete Tipples, 3 to 5 track, steel and wood.
- 3—Cleaning Plants, 1 Ea. McNally, Roberts and Schaefer, Jeffrey, Washers and Airflo Tables.
- 1—Roberts and Schaefer tandem hydro-separator.
- 1—Allis Chalmers 5x12 Low-Head Vibrator.
- 2—Allis Chalmers 5x14 Rippflo Vibrators.
- 2—Robins 5x14 double deck Vibrators
- 1—Robins Gyrex Vibrator 4x10.
- 10—Belt and Apron type Loading Booms.
- 6—Shaker Screens
- 1—Robins Car Shakeout.
- 10—Crushers, various sizes.
- Feeders, Belt and Drag Conveyors, Car Retarders, etc.

### CUTTING MACHINES

- 1—Joy 11RU, rubber tired, Cutter.
- 1—Jeffrey 70 URB Cutter, rubber tired, Universal Head, low vein.
- 2—Jeffrey 29UC Universal Machines on Cats.
- 1—7AU Sullivan on rubber, Universal Head.
- 1—Goodman on cats, 31" overall height.
- 3—Baby Goodman 212's, rebuilt, 250 DC.
- 2—Goodman 212 Cutting Machines, 19" high.
- 4—Goodman 312 Cutting Machines, 17" high.
- 3—Goodman 412 Cutting Machines, 19" high.
- 6—Goodman 512's with Bugdusters, like new.
- 4—Goodman 512's, rebuilt, or as removed from service.
- 1—Goodman 512, 220/440 volt AC.
- 3—Goodman 112's 220/440 volt AC.
- 2—Joy 7-B Cutting Machines, 220/440 volt AC
- 1—Joy 7-B Cutting Machine, 250 volt DC.
- 4—Joy 11B Cutting Machines, rebuilt, 35 and 50 H.P.
- 10—Goodman 12AA's and 112AA's, 250 volt DC.
- 2—Goodman 324 Slabbers.
- 2—Goodman 724 Slabbers.
- 6—Jeffrey 35L's, like new, 17" high.
- 2—Jeffrey 35L's on low vein trucks.
- 15—Jeffrey 35B's and 35BB's.
- 2—Jeffrey 29B's on track.
- 2—Jeffrey 29C's, track mounted.
- 2—Jeffrey 29L's on track, perfect.
- 2—Jeffrey 29L's on cats—Excellent.
- 3—Sullivan CE7, 220 volt AC.

### LOADING MACHINES

- 6—Joy 12BU with Piggy-Back Conveyors
- 16—Joy Loaders, 8BU, 11BU, 12BU, 14BU, 20BU.
- 1—Goodman 865 Loader, 26", on cats.
- 1—Goodman 665 Loader, on cats.
- 1—Goodman 660 Loader, on cats.
- 1—Goodman 460, rebuilt, On track.
- 2—Jeffrey 61 CLR's, on rubber, 26".
- 3—Jeffrey L-500 Loaders.
- 2—Myers Whaley No. 3 Automatic Loaders.
- 2—Clarkson Loaders, 26" above rail.

### CONVEYORS

- 2—Joy 30" Underground Belt Conveyors, 500' to 2000' each, Excellent.
- 2—Goodman 97-4, 30" Conveyors, 1500' long.
- 3—Robins 30" Belt Conveyors, 200' to 2600'.
- 1—Jeffrey 52-B, 26" Conveyor, 1200' each.
- 1—Jeffrey 52-B, 30" Drive and Tail Assembly, complete.
- 3—Robins 26" tandem drive Belt Conveyors, 1000' to 2000' long. Excellent condition.
- 2—Joy MTB 30" Drive and Tail Assembly, complete.
- 3—Goodman 97 HC 30" Drive and Tail Assemblies, complete.
- 8,000' Conveyor Belt, 30".
- 10,000' Conveyor Belt, 26", like new.
- 8—Jeffrey 61AM 12" Chain Conveyors, 300'.
- 2—61EW Elevating Conveyors.
- 2—61WH 15" Room Conveyors, 300'.
- 2—Joy 15" Room Conveyors, 300'.
- 2—Joy 20" Conveyors, 300'.
- 4—Joy Ladel UN-17 Shakers.
- 10—Goodman G-12½ and G-15 Shakers.

### CONVERTERS AND DIESEL PLANTS

- 2—100KW, G.E. TCC-6's, 275 volt, Rotary Converters
- 1—150KW, G.E. HCC-6, 275 volt, Rotary Converter.
- 1—150KW, 6 phase, Allis Chalmers Rotary Converter, 275 DC.
- 1—200KW Allis Chalmers Rotary Converter, 6 phase, 275 DC, perfect.
- 1—200 KW, G.E. HCC-4 Rotary Converter, 275 volt DC. Newly rewound.
- 1—300KW, G. E. HCC-6 Rotary Converter, 275 DC.
- 2—300KW Westinghouse, 6 phase, Rotary Converters, 275 volt DC.
- 2—500KW Westinghouse Rotary Converters, 275 volt DC.
- 2—200KW Westinghouse Rotary Converters, 275 DC. Newly rewound.
- (all the above with 6900/13000 and/or 2300/4000 primary transformers)
- 2—150KW MG Sets, General Electric and Westinghouse.
- 1—200KW MG Set, Westinghouse, rebuilt.
- 1—200KW MG Set, General Electric, perfect.
- 2—150KW Allis Chalmers MG Sets, 275 DC volt, excellent 220-440 AC volt.
- 1—300KW Westinghouse, 600 volt MG Set, rebuilt.
- 2—300 KW Westinghouse, 600 volt, 6 phase, Rotary Converters.
- 2—500KW Westinghouse, 600 volt, DC, 6 phase, Rotary Converters.
- 2—500KW HCC-4 Rotary Converters, 6 Phase, 600 volt DC.
- 1—GMC 471 Diesel with 60 KW, 250 volt DC Generator.
- 1—GMC-671 Diesel with 75 KW, 250 volt DC Generator.
- 1—GMC-671 Diesel with 110KW, 250 volt DC Generator.
- 1—Cummins 125 KW, Diesel with 250 volt DC Generator.
- 1—Allis Chalmers Natural Gas Engine with 100 KW Generator, 275 volt DC.
- 1—700 H.P. Shaft Hoist, complete.
- Complete steam plant will sell all or any part. Boilers, like new, 1100 H.P. and 500 H.P. Also transformers, turbines, etc.

### MISCELLANEOUS

- 5—Complete Tipples, 3 to 5 Track. Wood and Steel.
- 20—Jeffrey Molveyours on rubber tires.
- 1—¾ Yard Shovel and Back-Hoe.
- 1—¾ Yard Crane on Cats.
- Battery Supply Tractors, rubber tired.
- 1—Cantrell Air Compressor on rubber tires.
- 10—Air Compressors, 1 H.P. to 40 H.P.
- 2—Joy self propelled rubber tired compressors, 240 cu. ft.
- 2—Acme self propelled rubber tired compressors, 130 cu. ft.
- 40 Mine Pumps, all types.
- 1—Differential 40 Passenger Man Trip Car.
- 6—MSA Rock Dusters.
- 2—Phillips, Carriers, 44" and 48" Ga.
- 1—Barber Greene self propelled Bucket Elevator.
- Pipe, Plastic, Steel, Transit, all sizes 1" to 6".
- 300 Mine Cars, drop bottom, 42" Ga.
- 30 Mine Cars, drop bottom, 44" Ga.
- 100 Mine Cars, 18" high, end dump, 44" Ga.
- 300 Mine Cars, end dump and drop bottom, 26" high, 48" Ga.
- 1—10 ton Mine Car Scale with Recorder.
- 15—Brown Payro HKL and HG Car Spotters.
- 1—12 ton Differential Slate Larry.
- Incline Hoists, 25 to 50 H.P.
- 1—Jeffrey 5' Aerodyne Fan, like new.
- 1—Jeffrey 6' Aerodyne Fan.
- 1—Jeffrey 8' Aerodyne Fan.
- 2—Storage Tanks, 4,000 Gallons.
- 1—Storage Tank, 10,000 Gallons.
- 10,000 Five Gallon G. I. Cans, screw lids.
- 2500 tons Relaying Rail, 25, 30, 40, 50, 60, 70, 80 #.
- 100 tons Copper — 4/0 and 9 Section Trolley
- 1/2, 2/0, 4/0 Stranded. 500 MCM and 1,000 MCM Feeder Cable.
- Thousands of feet of rubber covered three conductor cable. All sizes.
- 300 Transformers from 1 to 300 KVA, 110 to 13,000 primary volts
- 400 Electric Motors, 3 to 250 H.P.
- Huge stock of mine supplies.
- Thousands of Other Items.
- 600—MSA Mine Lamps, Chargers, etc.
- 1—Fricke Saw Mill—Complete.

WE BUY—SELL—TRADE

**J. T. FISH**

PHONE PL. 2-4400, LOGAN, W. VA.

**WE'RE PROUD TO ANNOUNCE**

● A new steel-like material may offer engineers a replacement for plain steel forgings and permit design flexibility of castings.

It was developed by General

Motors Central Foundry Division and GM Research Laboratories, and described to the American Foundrymen's Society.

Known as Centra-Steel, the material consists of iron plus the following elements: 1.70% carbon, 2.25% silicon, 0.40% manganese, 0.10% sulfur, 0.05% phosphorus, 0.01% boron and some tellurium.

The metal has a high elastic modulus of 28,000,000 pounds per square inch — very nearly equal to that of steel. This means it will not deform until this pressure is exceeded. The material has the equivalent strength of steel and better castability and machinability. It does not require

extensive heat treatment, costly addition agents, injection apparatus or low maximum sulfur content.

The material's high silicon, low carbon content is the reverse of normal iron founding experience, but this proportion accounts for the material's high modulus and great ver-satility. This high elastic modulus suggests applications to parts for which many presently available cast materials would be unacceptable.

The metal is still in an experimental stage. Work is underway on the foundry problems that will have to be solved before high-volume production is begun.

## HEAVY EXCAVATION EQUIPMENT

Shovels - Cranes - Drills - Euclids

15-W Bucyrus-Erie Elec. Drag, 215', 13 yd.  
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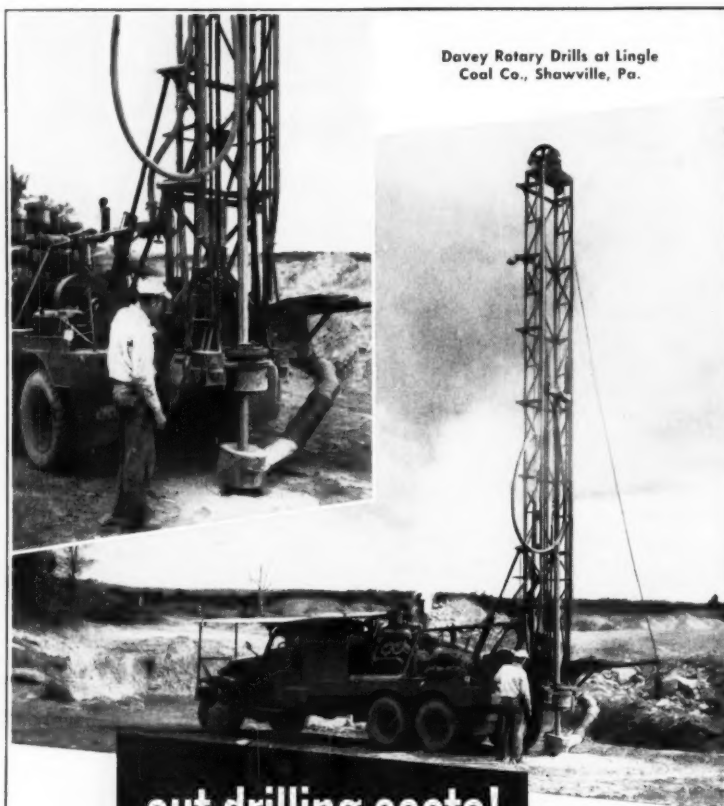
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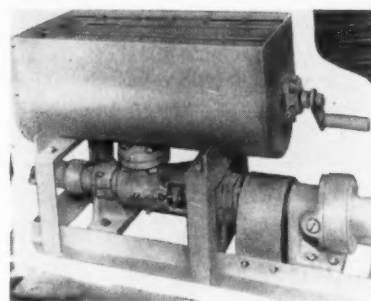
Field Service Units

Rotary Drills

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New M-S-A Model 80 Slurry Rock Dust Distributor is designed for permanent mounting on any mining machine. Powered either mechanically or hydraulically, the Model 80 is suggested for use in satisfying immediate rock dusting requirements in limited work areas of coal mines.

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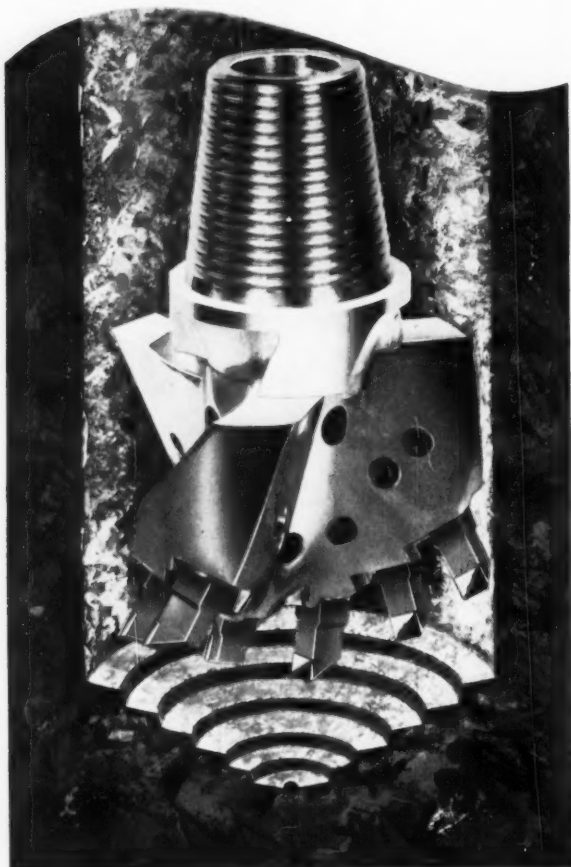
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# AUSTIN APA

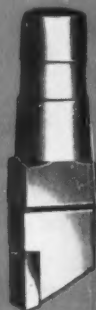
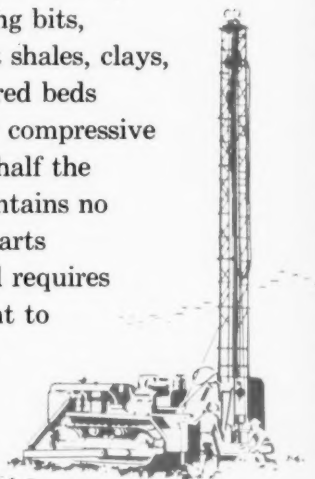
# DRILL HEAD

speeds air drilling  
cuts costs in soft rock



The 3-wing prop-type Austin APA drill head is specially designed to increase penetration rates and reduce the cost of air drilling in soft rock formations.

When compared with ordinary drill heads with rotating bits, APA cuts through soft shales, clays, shells, soft limestone, red beds and other rocks of low compressive strengths in less than half the usual time. Also, it contains no independent moving parts to become clogged and requires only a moderate weight to gain full effectiveness.



durable bits are easily replaced

APA drill head is furnished with special patented carbide-tipped bits. The latter have tapered shanks that drive-fit firmly into the drill head so that wedges and set screws are not needed. Unlike blade-type drill heads, bits are easily replaced . . . with hammer and punch.

Rapid-cutting carbide-tipped bits drive-fit in drill head. Replaceable in seconds with hammer and punch.

**5 SIZES**

adaptable to any rig

In addition to the Model APA, Austin produces a complete line of drag-bit drill heads with either square or hexagonal shanks that can be adapted to any type of drill rig. All are offered in 5 sizes for cutting holes of from 4 3/8" to 8 3/4" in diameter.

Austin drill head with hexagonal shank



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